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OUISIANA CONSERVATION REVIEW

EPARTMENT OF CONSERVATION, STATE OF LOUISIANA · SUMMER, 1939

What does the goldfish think of the college boy?

It is a question that might conceivably baffle a small army of psychoanalysts. We may only surmise what the goldfish is thinking, assuming that he thinks at all.

And we may be just as foolish as the goldfish-eating college boy appears to be, if we continue to "eat" our natural resources without replenishment; if we continue to waste or dissipate the blessings which Nature has bestowed on us in such generous measure.

In recent years reforestation has demonstrated what may be accomplished by looking ahead, planning for the future. Twenty-odd years ago the timber industry seemed to be in a hopeless condition, through the exhaustion of the native forests—now timber is being produced in Louisiana faster than it is cut, our pulp and paper mills are supplied with their raw material from second growth forests.

Conservation pays dividends—in the material well-being and future happiness of our people.

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GOVERNOR EARL K. LONG

■ The new governor of Louisiana was inducted into office Monday evening, June 26th, following the resignation of former Governor Richard W. Leche.

Governor Long is a brother of the late Senator Huey P. Long and close personal friend of Robert S. Maestri, mayor of New Orleans, who was the former State Commissioner of Conservation. He has had wide experience in public affairs, including three years as lieutenant governor. With his vigorous personality and loyal following, the spirited attack which he has launched on current State problems augurs well for his success in office.

The Career of Earl K. Long From Farm Boy To Governor

Loyalty to his friends and devotion to the members of his family are among the outstanding traits of Louisiana's new governor, Earl K. Long.

In the rough-and-tumble life of a country boy Earl learned some of those lessons that have served him well in his later contacts with a hard world. He was always close to his "folks," helping to take care of his father until the latter's death, and one of the effects of his early training may be noted in his attitude towards religion and apt quotations from the Scriptures.

While Earl and his older brother Huey did not always see eye to eye, especially in matters of political expediency, they were very much alike fundamentally, and throughout most of their lives they were very close together. Both were to a large degree self-educated, principally at the School of Hard Knocks, and each seems to have acquired an uncanny knowledge of human nature and political strategy.

Born in Winnfield, La., on August 26, 1895, Earl K. Long was 43 years old when he became governor of Louisiana, on the night of June 26, 1939.

Two years younger than Huey, the course of Earl's life seems to run in somewhat the same direction. As youngsters born and raised on a farm, they did the same chores, hunted and fished, as other farm boys do. There is no doubt that the rugged characteristics of determination and perseverance were developed by both brothers during those early days on the Winn Parish farm.

Huey obtained his first job at a neighborhood general store. Earl started his business career in the same way a year or so later. Both learned the selling game there, then ventured into broader fields, going on the road as traveling salesmen in their early teens when most boys are still in high school or under the parental roof.

Until they started traveling Huey and Earl were constant companions. Both were inveterate readers and students and continued to educate themselves as they traveled. This self study, the ability and determination to work out their own educational problems, perhaps indicates better than anything else the sturdiness of character that brought them both over the long road to success.

Huey and Earl were so busy selling drugs, groceries, hardware, etc, that they saw each other infrequently while on the road. Both were top-notch salesmen, but probably Earl had the edge on Huey in this field. Anyway, he rose to the position of divisional sales manager of a large St. Louis concern, covering the states of Louisiana, Mississippi, Alabama and Florida.

The brothers were brought back into closer contact in 1918, when Huey became a candidate for Railroad commissioner from North Louisiana. Huey was only 23 years old, and married; Earl was 21, and single.

Earl immediately started working for his brother's election; Huey on the stump, Earl doing the practical "politicking," tacking up Huey Long signs, ringing doorbells, button-holding prospective voters.

It is not strange, of course, that the new governor of Louisiana, Earl K. Long, should possess many of the vital characteristics that distinguished his older brother, the late Senator Huey P. Long; and a glance at the high lights of his career, from farm boy to chief executive of the State, reveals that the Spartan simplicity and struggles of their youth and early manhood toughened the fibre of their character and contributed to their later success. Scratch beneath the surface and you find a keen intellect, a direct method of approach and tenacity of purpose—a combination that is apt to overcome great obstacles, seldom accepts defeat.

"We only had two votes when we started, Earl's and mine, but we wound up with a state full," Huey once said.

Huey was elected to the railroad commission, which was later the Public Service Commission, and Earl returned to his selling job. Prior to this Huey had studied law for nearly a year at Tulane University and was admitted to the bar. Some time later Earl came to New Orleans and took a special course at Tulane, then began the study of law at night at Loyola University. These studies were intermittent, as he was compelled to be on the road selling much of the time. But he continued reading law while on the road; then in 1926 he took the bar examination and was admitted to practice.

Meantime Earl had advanced to an important selling post; and in addition to his selling and studying he continued as the most active political figure behind his brother Huey, who was now engaged in many campaigns besides his own. In fact, Huey entered local, parish and district fights in support of various candidates and began building a state organization—Earl usually could be found working hard but quietly in the background.

In 1924 Huey made his unsuccessful race for governor, with Earl working the country trails for him. In 1926 Huey, still Public Service Commissioner, supported the late United States Senator Edwin S. Broussard for re-election, and Earl mixed in his selling work by swinging North Louisiana votes for Broussard. He fairly blazed over that section of the state in this work.

In 1928 Huey made his successful race for governor, and this campaign found Earl carrying the torch for Huey throughout the country districts. He learned every city and town, every cow path. In the meantime he had begun to practice law in Winnfield and New Orleans, where he established regular offices and was appointed attorney for the inheritance tax collector by Huey.

When Earl desired to be the administration candidate for lieutenant governor on the O. K. Allen ticket in 1932, Huey declined to give him his support. Thereupon the two brothers "fell out" and Earl proceeded to run as an independent candidate. He polled a large vote despite the fact that he did not have organization support.

The split between the two brothers continued until a short time prior to Huey's death in September, 1935. The reconciliation was said to have been largely brought about by Mayor Robert S. Maestri of New Orleans, then state conservation commissioner and a close friend of both brothers.

After the reconciliation the two brothers became even closer than they had been before and at the time of Huey's death Earl ranked high in the councils of the Long organization. He was selected as the administration candidate on the ticket headed by Richard W. Leche. He was one of the leading figures in that campaign and was active on the stump for several weeks before others took the field.

While Huey was married at an early age, Earl waited until his middle thirties to wed. His wife, the present first lady of Louisiana, was Miss Blanche Revere, who spent her childhood in Covington and later moved to New Orleans, where she and the present governor were introduced. They are both fond of country life and spend a good deal of time on their farm at Winnfield but their present address is the White House, Baton Rouge, Louisiana.

■ Senator Ernest S. Clements, appointed Commissioner of Conservation by Governor Long, to succeed William G. Rankin, who recently resigned.

Like Governor Earl K. Long the new commissioner of conservation, Ernest S. Clements, was a small-town boy, born and reared at Oberlin, in southwest Louisiana.

Commissioner Clements is a graduate of Louisiana State University, which he left in 1918 to enlist in the U. S. Army, his diploma being forwarded to him at camp. On his return to Oberlin, at the conclusion of the World War, he obtained a position in a law office and also as Allen Parish court reporter. He later served as chief deputy clerk in Allen Parish, secretary-treasurer of the Allen Parish police jury and in 1936 he was elected to the State Senate on the administration ticket. He is chairman of the Senate conservation committee, a close personal friend of the new governor, whose measures he supported while the latter was lieutenant-governor.

Following his appointment by Governor Long the new commissioner was sworn into office by Secretary of State Conway at the Mansion in Baton Rouge on Tuesday, July 25, 1939.

Commissioner Clements is 41 years old, his parents being Mr. and Mrs. Edward S. Clements of Oberlin, La. In 1919 he was married to Miss Irene Woods of Oakdale, and they have one young daughter, Elaine Marion, who is a junior in the music department of L. S. U.

At the time of his appointment Commissioner Clements had announced his candidacy for re-election to the Senate, but he has entered on the discharge of his new duties with characteristic vigor, initiated a strict policy of economy and retrenchment.

"This conservation work is really a man's-size job," said Commissioner Clements. "Louisiana's natural resources now yield over $200,000,000 in annual revenue and it is up to all of us to see that this vast income is more equitably distributed for the benefit of our people.

"We should see that our wildlife is protected, our fish and game laws enforced, and that there is a minimum of waste and dissipation of our rich mineral resources."

Geology of Caldwell and Winn Parishes

The report of the Geology of Caldwell and Winn Parishes, Geological Bulletin No. 15, which was prepared by J. Huner, Jr., Ph. D., of the Research Division of the Louisiana Geological Survey and being published by the State Department of Conservation, is devoted to a detailed discussion of the physiography, stratigraphy, salt dome geology and economic geology of that part of north central Louisiana occupied by these parishes. A brief discussion of the early history and development of the region is also included.

Field and laboratory work necessary to complete this report required a period of two and a half years. During this time hundreds of samples were collected from various outcrops and examined in the laboratory, chiefly, for their microfaunal content. Hundreds of miles were traversed in the region on foot, by car and in boat in order to examine, compare, and describe the outcrops. The data thus obtained has formed the basis for the construction of the geologic maps (scale 1:62,500) of Caldwell and Winn Parishes which are included in this report.

Field evidence has shown that the region as a whole can be simply divided into two physiographic provinces, namely: (1) the alluvial valleys province, and (2) the dissected hills province. The latter can be subdivided and includes such divisions as the Pleistocene depositional terraces. It was found that along tributary streams the Prairie or youngest Pleistocene depositional terrace merges upstream with the flood plain. This suggests that the Prairie terrace should also merge with the flood plain of the Red and Ouachita Rivers farther to the north of Caldwell and Winn Parishes.

Both field work and a detailed study of the topographic quadrangles which covered the floodplain area of the Ouachita and Mississippi Rivers show that the Ouachita River south of Ouachita City (Ouachita Parish) occupies a former course of the Arkansas River. The latter in turn apparently occupied abandoned Mississippi River courses in this area. Numerous ancient channels of the Arkansas are indicated in the present alluvial valley east of the Ouachita River.

All the known wildcat wells drilled in these parishes and the available data concerning them are listed in the appendix. The bibliography includes references to papers dealing with the geology of or geological problems related to Caldwell and Winn Parishes.

Besides geologic maps of each parish the report contains 30 figures and 13 plates.

Needed—Sane Program of Ecology

The Middle Course to Conserve our Water and Wildlife Resources

By
"Conservationist"

Typical Louisiana swamp.

Within the next few years, under the stimulus of our agricultural and industrial development, the State of Louisiana will have the opportunity to profit by the experience of other states that have destroyed their swamps and marshes by drainage; to apply the scientific knowledge gained in the control and direction of this phase of exploitation at the expense of our wildlife and water resources.

It is not intended here to suggest that we should curb the enterprise of our reclamationists and drainage enthusiasts—merely that we should not rush blindly into drainage projects without study and due consideration of the effect of this enterprise, the benefits that we are giving up in order to obtain other benefits that may not compensate us for those which we have lost.

When we consider the fact that our nation is geared to an agricultural and industrial production beyond the capacity of our present rate of consumption, that there are vast areas of arable land not yet cultivated and comparatively little intensive cultivation of areas that have already been drained, we may well question the expediency of an unrestrained program of drainage.

Probably no other state in the Union offers an equal opportunity for the application of modern principles of ecology to this important problem, for no other state possesses such an extensive area of virgin swamps and marsh-land. We not only have to consider the conservation of our wildlife but the effect on our underground water sources and other areas not yet utilized in the expansion of agriculture and industry.

In the case of the community as with the individual, we may not recognize the outline and features of the Frankenstein which we ourselves have created; in our enthusiasm over the immediate prospect we may lose the long-range perspective.

In any event we will not be true to our stewardship of Louisiana's natural resources if we permit a wholesale and wanton sacrifice of our swamps and marsh-land without a scientific knowledge of what we are doing. To the casual observer it might appear that the substitution of a sugar-cane or rice field for the swamp or marsh would be another step in the march of progress, but it is because he has not considered the latter an asset or analyzed its latent and potential benefits to the community.

U. S. DRAINAGE PROJECTS

There were 84,408,093 acres of agricultural drainage projects in the United States in 1930—more than the total combined area of England, Scotland, Wales and Ireland. In addition to this thirteen states without organized drainage projects reported 17,554,635 acres of farms on which drainage had taken place.

One authority says that within our generation we have drained 17,000,000 acres of water from the North Central states and the prairie regions of America, where the drought has been most severe; that by ditching and drainage we have contrived to convert 17,000,000 acres of what was once marsh and lake land into fields on which the misdirected agriculturalist has sought to raise more grain to contribute to an already oversupplied market.

This enormous acreage does not include the additional areas that have been ditched for mosquito control. If one were to fly over the salt marshes, from the southern border of Maine to the northern border of Virginia, one could see very few parts of the marsh that had not been slashed every 150 feet by drainage ditches.

The drainage of wildlife habitats has devastated some of the richest areas of the United States, such as the Kankakee Marshes in Indiana, the Horicon Marsh in Wisconsin and Malheur and Lower Klamath Lakes in Oregon and California.

We have an extended and dramatic account of what drainage did to one of the most important wild-life habitats in North America from the pen of Dr. F. E. Ling. Describing the wild-life resources of the old Kankakee Marsh, Dr. Ling says:

"During the migration season ducks, geese, brant and cranes were on the Kankakee area by the thousands and there were all varieties, from canvasbacks to fish ducks. Canada geese fed on the prairie in the wheat and corn fields and rested on the marsh by the thousands. The tales some of the old-timers tell are almost unbelievable. Sandhill cranes were plentiful but nearly as numerous as geese. Many swans were seen on the marshes. Later in the season hundreds of herons, blue and white, nested here. At different places in the swamp the cranes had what we call 'crane towns.' Hundreds of them would meet in one locality in the cottonwood trees. . . .

"The principal fur-bearing animals were muskrat, mink, otter, skunk, raccoon, fox and beaver in the early days,

[Turn to Page 58.]

■ Recent luncheon meeting of oil scouts of the Gulf Coast area, at New Orleans.

Oil Industry Headed Towards New Orleans

Recognition of the potential importance of New Orleans as an oil center is indicated by the increasing interest of representatives of the industry in the advantages and attractions of the Southern metropolis.

Many of the leading executives of the oil industry visited New Orleans for the first time, to attend the recent convention of the American Petroleum Institute, and they were impressed by the progress of public improvements and the beautification program of "America's Most Interesting City."

"Orleanians may not be aware of it," said one of the visitors, "but their city has many unique attractions, potential assets to be found nowhere else in America.

"I am not thinking of the Old Quarter, which is indeed a distinctive asset, but of Lake Pontchartrain, right at New Orleans' front door—the largest body of inland water in the United States that is not ice-bound in Winter. This means aquatic sports the year 'round. Then, too, within a few miles of New Orleans are some of the finest fishing and hunting grounds in the world.

"I mention this because it is associated in my mind with New Orleans as a comfortable city in which to make one's home and transact business—surely that will be an influential factor in the development of the city as an oil center.

"With the eastward trend of oil production in the Gulf Coast sector it is becoming more and more apparent that New Orleans is the logical location for supply houses, assembly depots and other departments of the oil industry, which has taken the lead as the largest revenue-producer in the State."

The following oil field equipment and supply companies are now located in or represented in New Orleans:

Standard Supply & Hardware Co.; Woodward Wight & Co.; Murray Baker Frederick; Wilson Supply Co.; Harvey Lumber & Supply Co.; Maxwell Supply Co.; J. Ray McDermott; Louisiana Materials Co.; American Iron & Machine Works; Bishop-Edell Machine Works.

There is a regular weekly meeting of oil scouts in New Orleans. At their last luncheon there was an attendance of twenty-three, as follows:

M. Q. Petersen, Petersen Petroleum Corp.; Jas. T. Grafton, Gulf Oil Corporation; R. J. Campbell, Lisbon-Iberia Oil Co.; C. A. Lomax, Gulf Oil Corporation; A. S. Love, Gulf Oil Corporation; H. C. Petersen, Freeport Sulphur Co.; Cyril K. Moresi, Louisiana State Geologist; W. K. Rainbolt, Sun Oil Co.; Gayle Griffin, Superior Oil Co.; W. F. Smith, William Helis Oil Co.; Joseph G. Heyck, Humble Oil & Refg. Co.; Lawrence W. Hewitt, Midstates Oil Corp.; H. L. Carnahan, Independent Oil Operator; Cecil W. Mann, Wm. Helis Oil Co.; Peter F. Dunn, Independent Oil Operator; Jack Hayes, California Company; Paul W. Mackey, The Texas Co.; Joe C. Hemphill, Magnolia Petroleum Corp.; J. E. Lytle, Union Producing Co.; Fred O. Mills, Humble Oil & Refg. Co.; O. P. Kiker, Jr., Humble Oil & Refg. Co.; Edward F. Stauss, Jr., Humble Oil & Refg. Co.; Donald Goodwill, Jr., Louisiana Department of Conservation.

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Along the Natchez Trace, one of the most historic thoroughfares in the East, are such picturesque landmarks as Rocky Springs Church, Ruins of the Red Tavern and Elizabeth Female College, Mississippi. This institution, the first women's college in America to confer degrees on women, was chartered in February, 1819. Audubon, the celebrated ornithologist, was a member of the faculty.

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An interesting possibility for the use of wastewood lies in the use of hydrolyzed woodmeal as a carbohydrate cattle-food.

Our Oil Reserves and the Art of Prospecting

By
E. DeGolyer*
[*Louisiana Land and Exploration Co.*]

Prospecting for new deposits is a part of the ordinary routine day-by-day business of the petroleum industry to an extent that is not true for any other mineral industry. The prospecting branch is of prime importance and while most of you are probably interested in production, the results of prospecting—finding when successful—are of prime importance to you whether you are a producer, refiner, marketer, or pipe liner. The health of the industry depends upon whether we are successful or unsuccessful in finding and in degree and you can afford to give it your best attention, no matter in what branch of the industry your daily work falls. As I have said elsewhere, "The industry cannot deny that it is, to borrow a term from the mathematician, a dependent function of an independent variable—exploration."

How many of you know what it costs to find oil today and what it has cost in the past? Very few, if any, I will wager. The industry is not well informed upon this extremely important point. We cannot deal in averages for lack of information. Does it cost more or less than previously? Prospect wells are increasingly deeper and, since the introduction of the core drill, prospecting techniques have required increasingly expensive field operations. One would seem to be justified in hazarding the guess that the cost of finding—of successful prospecting—has gone up. Such is not at all the case. With good, not average practice, the cost of oil finding in the early twenties was twenty to twenty-five cents per barrel. Today, on volume operation, the cost of oil finding for good practice is ten to twelve cents per barrel.

The cost of actual field operations has increased enormously but the oil per unit field found has increased substantially and the hazard of prospecting has decreased considerably.

PROSPECTING A SCIENCE

Prospecting is a science as well as an art. It is dynamic rather than static and if I can prove this single point to you this afternoon to a degree that you are willing to accept, you will, I hope, have a clearer idea of the condition of the industry than you can have without this viewpoint.

We can estimate with reasonable accuracy the amount of the Nation's proved reserves. We can only speculate as to the amount of unproved reserves. What the total known and unknown reserves may be is beyond the possibility of definition by any man. We have been prematurely alarmed with regard to the exhaustion of our oil deposits in the past, or so it now appears, but we cannot deny that we are exhausting our reserves at a tremendous rate. I am not an alarmist and do not expect to live long enough to see the arrival of that oft predicted day of shortage. I am a prospector, however, and I am very much concerned with trying to forecast for my own guidance, if for no other reason, the rate at which we may discover our unknown and undiscovered reserves.

The author of the accompanying article has made many important contributions to the science of geophysics and his name is familiar to the leaders of the oil industry. He was a pioneer in the geophysical prospecting of the Gulf Coast area; his suggestion of new techniques in exploration will no doubt be of considerable interest.

THE OLD-TIME PROSPECTOR

From the beginning of the industry in 1859 to 1900 or even later, prospecting was carried out on a casual and random basis. Men drilled on oil and gas seepages, along the beds of streams, along trend lines, at some point where the topography resembled or had a fancied resemblance to some other area which they knew was oil producing, or for no reason at all. The demands upon the industry were not great, drilling depths were shallow, and there were enough venturesome souls to find sufficient oil by the crude methods available to them to meet and often more than meet the Nation's demands. Until the turn of the century, substantial production was confined chiefly to the States east of the Mississippi and the total production during that period was only slightly more than enough to meet one year's requirements at the present rate of consumption. With the turn of the century, however, substantial oil production spread to Louisiana, Texas, Oklahoma, Kansas, and California. For a short period these added supplies were largely taken up by the use of oil as fuel under boilers, replacing coal, but by about 1910 or 1911 the rapid increase in the use of automotive vehicles began and continued without slacking until 1929 and we had come into the period when the important market for oil is the gasoline or motor fuel market.

The old hit or miss methods of prospecting were no longer adequate and geology, which had previously been largely speculative as far as the industry was concerned and only used spasmodically, was accepted as a guide to prospecting.

SEPARATE TECHNIQUES

You may think of our prospecting efforts as one long, slowly developing art. This is only partly true and you will not understand the problem with only this view. Prospecting has really been a series of more or less separate and distinct techniques. Each technique comes in slowly, is accepted and peaks rapidly, carries on for a few years, and then becomes relatively unimportant. I shall not attempt to describe the whole complex and complicated detail of this series of techniques but, in order to make my point, will select and describe some of the more outstanding ones.

When geology first came to be accepted as a guide to prospecting, depths were still relatively shallow and the beds in which oil was expected to be found were generally more or less parallel to those outcropping at the surface. A surface dome or anticline could be accepted as indicating with a high degree of probability the existence of a similar dome or anticline in the oil sands. The earliest mapping of surface structures was done with clinometers, hand levels, and spirit levels. By 1913 the plane table had come into general use as being superior to the older methods and most of the surface geology which was mapped for the purposes of oil prospecting was mapped with the plane table.

Now individual techniques become useless and are largely discarded for one of two reasons: They have either exhausted their usefulness by having covered the entire area in which they were fitted to work or they have been replaced, wholly or in part, by some newly discovered technique which is either as good as the old one and cheaper or more rapid or which is better than the old one.

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* Paper presented at American Petroleum Institute meeting, New Orleans, La., April 17, 1939.

SURFACE GEOLOGY

By the early twenties most of the territory in Oklahoma which represented practical prospective territory, considering the drilling depths of the time, had been exhausted and the prospector was almost driven back onto casual and random drilling. No better example of the exhaustion of the technique of surface geology can be found than is shown in the prospecting of the Seminole plateau. The structure of the underlying oil-bearing beds was certainly not revealed by the geology at the surface. The best one might say for the surface geology of this area is that the underlying oil pools were indicated by marked geologic abnormalities. It was not a question of finding an anticline at the surface which might be regarded as reflecting an anticline in the Wilcox beds underneath the great unconformity at the base of the Pennsylvanian, but rather a question of drilling on any surface irregularity which might or might not be represented by the desired structure below.

About this time a new technique of prospecting came in—core drilling. Its widespread use was checked by the development of still another technique—that of mapping underground structure by the use of reflection seismograph. There is no question but what core drilling over wide areas would have continued as the best practice if the use of the seismograph had not been perfected. As it was, the use of the core drill was confined chiefly to Western Kansas, where its results were more useful than those of the seismograph of the time. At present, most of the subsurface of Oklahoma, to drilling depths which the operators of that State are prepared to accept as practicable, has already been mapped by the use of the reflection seismograph and in consequence the State has lost much of its attractiveness as an area for prospecting. It is in somewhat the same condition as during the early twenties when the technique of surface mapping had practically exhausted itself.

THE GULF COASTAL PLAIN

Let us take some other example somewhat nearer home: The Gulf Coastal Plain of Louisiana and Texas is an area in which the oil is generally associated with the occurrence of salt domes. Spindletop, where the first commercial oil was produced in the area in early 1901, is a salt dome. Its surface expression is that of a low mound in the exceedingly flat Coastal Plain, marked by gas seepages in pools of shallow water and incrustations of sulphur in the soil. Upon the discovery of Spindletop, every topographic dome and gas seepage in the Coastal Plain became a prospective oil field and within the first few years most of these indications were prospected by the drill. Many of them were prospected with great success and a series of salt dome oil fields such as Jennings, Sour Lake, Humble, Saratoga, Batson, Hull, Goose Creek, West Columbia, Vinton, and Edgerly were developed. During the twenty years that followed, not more than a half-dozen additional salt domes were found. An occasional oil field was found on one of the old, well known domes, but practically no new prospects were added and prospecting, even for salt domes not to speak of oil fields, was a highly hazardous and speculative undertaking. In the early 1920's geophysical methods were introduced into the Coast area, first the torsion balance and then the refraction seismograph. Now the refraction seismograph is one of the clearest examples of which we have knowledge of the discovery, development, and final exhaustion of usefulness of a definite prospecting technique. The refraction seismograph, not to be confused with the reflection seismograph which is now being used, depended for its success upon recognizing different formations from different rates in the speed of transmission of artificially induced sound waves. The velocity of sound through salt is at the rate of about fifteen or sixteen thousand feet per second. Through the ordinary sands, clays, and shales which make up the country rock of this area, the rate of transmission is generally five to six thousand feet per second. Dynamite was exploded at the shot point, the time of firing transmitted by radio to the observing instruments at a known distance (generally from two to five miles away) and the existence of a salt dome was indicated by the arrival of the sound of the explosion through the earth in less than normal time: the so-called "lead" of the seismograph operator.

REFRACTION SEISMOGRAPH

The refraction seismograph was first used on the Coast in Texas in 1924. By twenty-seven or twenty-eight, dozens of crews were in operation and the whole area was at the height of a hectic campaign of seismic exploration. By the early thirties, the whole area regarded as prospective salt dome territory had been explored, some of it five or six times by different companies, and the refraction method had practically exhausted its usefulness. There was a lull of a year or two during which little exploration work was done with the seismograph and its use was confined largely to detailing and developing prospects which had already been found.

About 1931 the reflection seismograph came into use on the Coast, the industry had a new technique, and the entire Coast is now in process of being resurveyed with it.

The refraction campaign was extremely successful. Some fifty or sixty domes, practically as many again as the number previously known to exist, were discovered by its use at an expense for geophysical work alone of twenty to thirty million dollars. We have a clear example here of the rise, use, and fall of a definite prospecting technique within a period of about seven years.

These various examples which I have cited are enough to make the point which I wish to bring to your attention—the art of prospecting for oil consists of a series of individual techniques, sometimes overlapping, sometimes separated by a time gap, but techniques which lose their usefulness and which leave us without guide to our prospecting until we devise some new method. Surface geology is an exhausted technique. Shallow core drilling, except for certain areas where it is particularly useful, is a partly exhausted, partly replaced technique. The refraction seismograph is an exhausted technique. We are now in the midst of an exploration of the Gulf Coast area by the use of the reflection seismograph. It now appears that within a few years the entire Coast will have been examined by this method and we shall again be without technique to guide our prospecting until some new method shall have been developed.

NEW TECHNIQUE IN OFFING

With the understanding of prospecting as a dynamic art, as is exemplified by the rise and fall of these various techniques, it becomes worthwhile to try to look into the future to some degree in order to see whether or not there is being developed some new technique, hardly progressed beyond the state of research. I have only two suggestions to make: It may be that some of the many electrical methods which are being tried will be the solution to our future problem. It may be that our new technique will be some form of soil or soil gas analysis such as is now being experimented with or some method which may arise out of the experimentation now being carried on.

Only a rash man will prophesy, but being a rash man and having followed with considerable interest a part of the experimentation which is now being done, I will hazard the guess that our new technique will be some form of soil or soil gas analysis. If the researches now being conducted are not successful in establishing either of these as a working technique and if no other technique is

[Turn to Page 55.]

Interstate Pollution Control on The Delaware River

By
J. B. Ferchaud, Jr.*

The continued and rapid expansion of industry along with the concentration of population in urban centers has brought to the front a problem of great concern to all our people, that of stream pollution by industrial and domestic wastes.

Since industry was created by the people to serve the people and is a vital part of our national life, directly responsible for our high standard of living, the highest in the history of time, it must be preserved. On the other hand, the streams of this country have been designated by Federal Law as the primary source of water for domestic consumption; and, of course, pure water is necessary for the continued health and well being of the people; so the streams too must be preserved. Also, in the operation of industry a supply of clean water is essential and the streams are the main source.

Accepting these facts brings us face to face with the job of solving the waste disposal problem so as to preserve our streams and at the same time avoid placing too heavy a burden upon industry.

The adopted program for the correction and control of pollution of the waters of the Delaware River presents us with a clear example of how this problem can be approached in a manner that may help to restore our streams to their original and natural condition, preserve them in this state, and yet not cripple industry.

The Delaware River originates in the Catskill mountains of New York state, winds its way 350 miles through four of the most thickly populated and highly industrialized states of our nation, and finally empties into the Atlantic Ocean.

COMPLICATED PROBLEM

The approach to this problem is complicated by three serious factors: first, four states, namely New York, Pennsylvania, New Jersey, and Delaware, all of which are involved, must cooperate in the efficient enforcement of any regulations: second over three million people live along this river; and, third, many industries including several large oil refineries must dispose of their wastes in this stream. Because of these factors, we have an excellent picture for the study of cooperative effort of government, people, and industry.

Before the control of pollution by cooperating state governments, all the industries were dumping untreated wastes into this river. Statistics on domestic sewage show that thirteen cities having a population of 350,000 people had no sewage treatment facilities; that eight cities totaling over 225,000 people had only primary treatment works; that in one city of about 58,000 people, screening of the sewage was the only operation; that two cities containing over 2,000,000 people had primary treatment works for only 20% of their sewage. This was a burden that the Delaware River could not handle alone. The governing agencies of these four states, because of the deplorable condition existing at various places on the river, decided something must be done and undertook the job of cleaning up this stream without hurting anyone concerned.

INTERSTATE COMMISSION

An interstate commission was formed by the four states and a reciprocal agreement entered into, each of the states pledging full and faithful cooperation in the control of future pollution and in the correction of existing pollution of the waters of the interstate Delaware River. To begin with, each of the states passed adequate legislation to enable the state agencies concerned to require the treatment of sewage, industrial wastes, and other pollutants. The main idea behind all pollution control was to preserve and improve the degree of purity of the waters of the streams of these states for the protection of the public health, animal and aquatic life, and for industrial consumption, recreation, and protection of domestic water supplies.

With the power to enforce any corrective measures, the task of making a complete stream survey was undertaken to determine accurately the existing conditions in all parts of the river. Having this data as a guide, and recognizing that no single standard for the treatment of wastes at all parts of the river could be adopted due to the many variable factors, such as character and flow, and the varied uses of these waters, the Interstate Commission divided the river into four zones. Each zone had separate and distinct requirements pertaining to the discharge of effluents. These requirements were such as to maintain the Delaware River in a clean and sanitary condition at all times. All these standards were made minimum standards that could be easily increased if the demand justified. This was necessary because of the many variable factors involved and the impossibility of forecasting future developments with any degree of certainty. No attempt was made to tell parties concerned how they were to make their wastes meet these standards. It was up to each industry to submit a complete list of their wastes, describing the quantity and character of each, and the contemplated treatment methods in a report containing diagrams and complete details. These plans had to be given a conditional approval by the proper authorities, such approval depending on results obtained. If these methods failed to accomplish the desired results, then others had to be adopted in the same manner until one that did do the work was obtained. All responsibility for the success or failure of adopted methods rested on the shoulders of the party adopting the method and not on the regulatory agents.

CHANGING CONDITIONS

It is well to say at this point that it was realized that pollution regulations could not be made by governmental pact, adopted and approved by state or federal legislatures, because in pollution cases, conditions change so rapidly that it is impossible to predict today what the conditions might be next year. For this reason, the setting of standards and the formulating of regulations were left in the hands of a competent and efficient technical staff who could alter and change them as the time and place justified. The law back of this work was merely for the purpose of giving power and authority to the state agencies concerned for the proper enforcement of any adopted regulations regarding waste disposal.

The domestic sewage wastes were also found to be a source of the pollution in the Delaware River; so a treatment program was adopted to take care of this difficulty. Of the thirteen cities dumping raw sewage, three were made to put in complete treatment works, while the remaining ten had to install primary treat-

[Turn to Page 14.]

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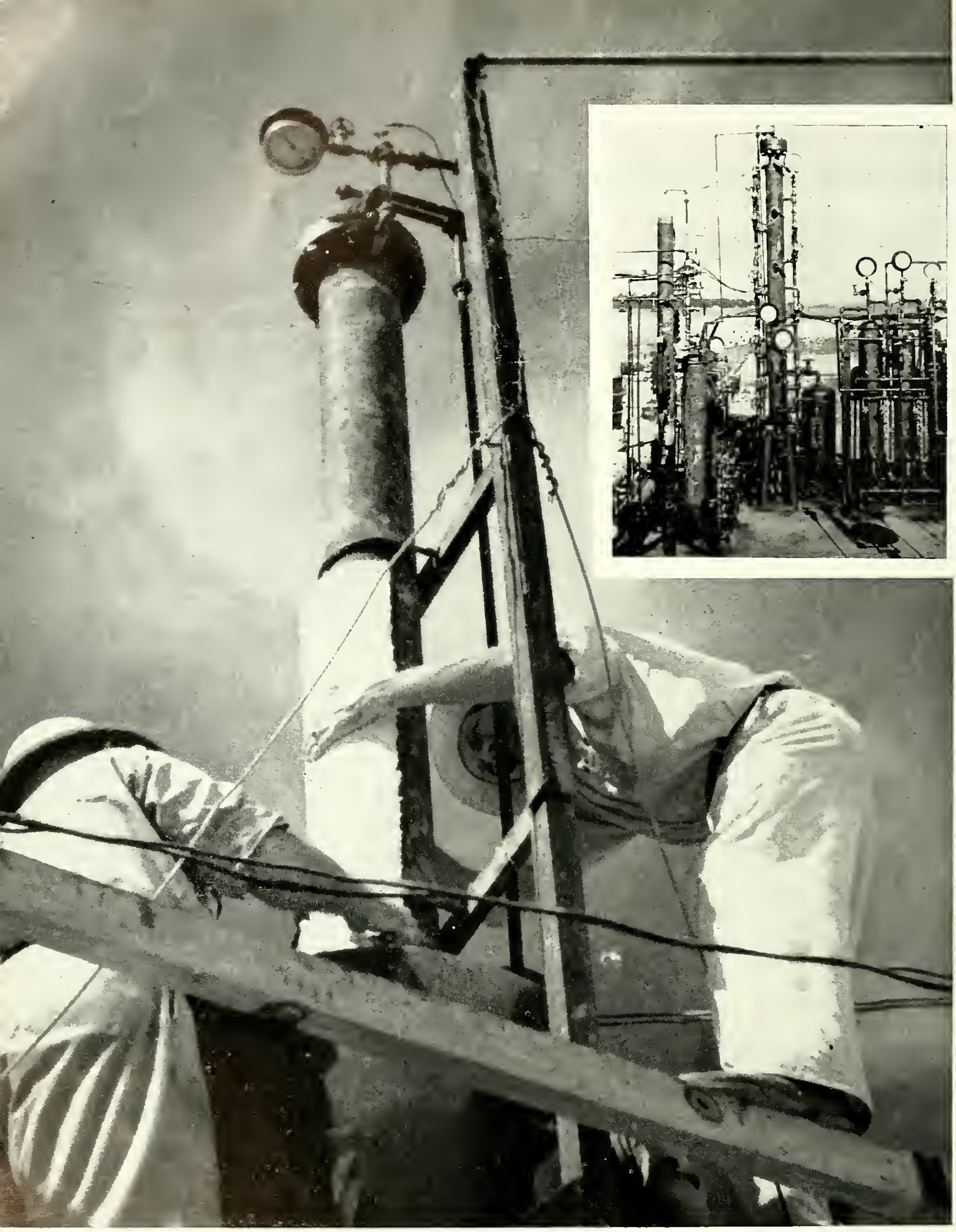
* Chemist, Department of Conservation.



■ Workmen placing insulation on still column of the experimental high pressure absorption plant at North Tepetate. Inset—Small-scale high pressure absorption plant at North Tepetate.

Condensate Production and Conservation

By
A. L. Vitter, Jr.*

With the realization that the new condensate reservoirs of the Gulf Coast constitute a considerable portion of the future reserves of the United States, Louisiana is vitally concerned with the conservation of these resources. Already there are many fields of this type producing in South Louisiana, some of which are North Tepetate, South Jennings, Lake Arthur (South Roanoke), Lirette, Bay Baptiste, Lake Long, Bayou Des Allemands, Lake Barre, Gibson, Donaldsonville, Paradis, Raceland, and West Dulac (De Large). Cotton Valley among others in North Louisiana is another field producing condensate. There is little doubt that many more will be discovered and produced in the future, especially with the progress of deeper drilling.

Condensate production presents new problems to the industry, the most important of which are conservation problems. All of these problems are intimately concerned with the behavior of paraffin hydrocarbon mixtures and so there exists a salient need for furthering investigation into the fundamental phenomena of these mixtures.

The term "condensate" refers to the liquid which in most fields is water-white or slightly colored and it is produced from the aforementioned and similar fields. It has more the appearance of refined gasoline than the usual heavier crude, as it is constituted of more of the light vaporizable paraffin hydrocarbons as exist in gasoline. The term "distillate" is also used synonymously, but "condensate" is more accurately descriptive and less confusing as will be realized later in the discussion if its properties.

HIGH GAS-OIL RATIO

These condensate fields are of a rather high gas-oil ratio, varying from 10,000 to 100,000 c.f./bbl. In most cases the contents of the virgin reservoir are all gas and when brought to the earth's surface with consequent reduction of temperature and pressure, there is a condensation of liquid from the well effluent. Furthermore, when the reservoir is all gas, it is usually at or near its dew-point. That is, it is on the verge of condensing in part, pending a reduction of temperature or pressure or both.

As these condensate reservoirs are produced there is naturally a decline of reservoir pressure due to the space voided (where water drive is negligible) and the result is a retrograde condensation within the reservoir, the liquid remaining there to wet the sand. Adhesive forces then hold the liquid to the sand so that it is thereafter commercially unrecoverable.

A similar phenomenon is exhibited on cool mornings with the formation of dew on the ground. The analogy is close except that dew on the ground is formed by the drop in temperature whereas "dew" or condensed oil in the reservoir is due to a decrease in pressure. The problem of the petroleum technologist might be better realized if one considers what the corresponding problem would be if he were concerned with the extraction of water (oil) from the atmosphere (reservoir). He would of course try to avoid any drop in temperature as that would cause a formation of dew in the atmosphere (reservoir) and this water vapor would be lost to him. He would instead draw air into an enclosed vessel and there reduce the temperature. The water vapor would condense out as dew in the bottom of the container while the dried air would be returned to the atmosphere.

The petroleum technologist does almost the same thing. He tries to maintain the pressure in the reservoir and takes the contents of the reservoir into a container which he calls a separator and there allows a reduction of pressure which causes a condensation of a liquid out of the well effluent. If he is interested in getting the most condensate out of the reservoir he pumps the "dried" gas back into the reservoir to maintain pressure and at the same time realizes

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* Physicist, Dept. of Conservation.

■ **Small-scale Production Test Trailer.**

(Photo courtesy of Black, Sivolls & Bryson, Inc.)

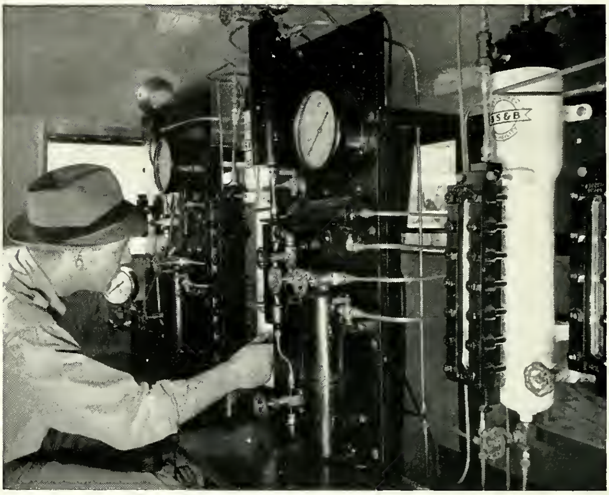
many other advantages by this action, as discussed in a previous article by the author.

HYDROCARBON MIXTURES

At first glance it is just that simple and the problem of the petroleum engineer seems no more difficult than that of the air-conditioning engineer. Unfortunately, the petroleum engineer finds that as he studies his problem more closely he does not know nearly as much about the behavior of condensate reservoirs as the air-conditioning engineer knows about controlling humidity and temperature. He can determine by trial and error how to get the most recovery from a well and has some general ideas as to the best way to produce such a condensate reservoir but he desires a lot more definite information as to how to obtain the very maximum of recovery efficiency that is compatible with the interests of his company, royalty owners, and conservation regulatory bodies. He also would like to know how to make a reliable estimate of the ultimate recovery so that he might lay out an equitable plan of operation and return on investment. The answer to all these problems he realizes lies in a more complete knowledge of the fundamental phenomena of hydrocarbon mixtures. And so he has started investigations of this nature.

The general problem of the behavior of hydrocarbon mixtures is very complex so the natural procedure is to start with a study of a group of simple binary mixtures (two hydrocarbons), from which the general qualitative behavior of a complex mixture (an actual condensate sample) may be predicted. It might seem at first logical to study one hydrocarbon at a time and then after knowing the behavior of all of them individually it would be a simple matter to predict the behavior of any mixture of them. The only fallacy in that logic is that possibly hydrocarbons are affected by their environment, that is the kind and amount of other hydrocarbons mixed with them, and such is the case. They behave differently in the presence of other hydrocarbons and so the complexity of the problem becomes evident. Engineers have come to use a method of equilibrium constants to calculate their desired information with reliability of various degrees,—the general run of which are in error from 5% to 20%. The lower limit of this error is not too objectionable and calculation with only that error, although rare, would be useful, but the unfortunate part is that the engineer has no very good means of knowing just how much he is in error till he finds out by an actual test. This does not mean that his predictions are worthless. They are an intelligent basis upon which to outline tests to approach the knowledge of the actual facts. Preliminary full-scale and small-scale field tests and laboratory tests of field samples supply information which together may be correlated into the calculations to give more reliable information.

And so, the petroleum engineer struggles with his problem, gradually becoming more intimate with the behavior of condensate production. Some day he dreams of knowing all the answers when someone asks: How many barrels of condensate may be ultimately recovered by conventional methods of production and at what rate should this production be set? He knows pressure maintenance is imperative but he would like to say very specifically just what will be the percentage increase in ultimate recovery over conventional operations. He might even dream of a stabilized market and then tell you what a field is worth in dollars and cents and how to operate to realize that optimum recovery over the optimum life of the field !! However, before that dream is realized he sees ahead of him many hours of study and research.



(Photo courtesy of Black, Sivalls & Bryson, Inc.)

■ **Interior of Test Trailer showing control panel.**

Interstate Pollution

[Continued from Page 11.]

ment for sewage. The eight cities having only primary treatment for sewage were required to completely treat their sewage. The two cities, containing over 2,000,000 inhabitants, that had primary treatment of only 20% of their domestic wastes were required to install primary treatment for the remaining 80% of their wastes. This entire program is to be completed by January, 1947.

From this study of the control of pollution of the Delaware River, we secure a general method of attack that may be employed by all states endeavoring to regulate and control the disposal of industrial and domestic wastes into its streams. The results obtained so far on this river demonstrate conclusively that streams can be preserved without destruction of industry, and at the same time, in many cases, will show the way to additional revenue by the recovery of many products which today constitute waste.

"SPORTSMAN'S CREED"

The sportsman should always follow "The Sportsman's Creed and Dogmas," which are as follows:

1. Shoot carefully and respect the farmers' property.
2. Take only your share of the game, your license does not permit you to shoot or fish for another.
3. Leave a goodly number for replenishment. Don't always take the limit.
4. Stamp out all fires.
5. Feed the birds in winter.
6. Do not burn the meadows in nesting time.
7. Drive with care—the wild life cannot cope with our speed.
8. Remember the child is somebody's boy or girl—Do not drive recklessly or carelessly. Preserve a life.

* * *

The manufacture of stock food from woodwaste is advocated by the U. S. Forest Products Laboratory.

Beaver in Louisiana

By
Bernhard C. Dahlen

■ Close-up of Beaver, showing texture of fur.

Much has been said of our many fur-bearing animals, especially our Louisiana Muskrat, but one of our mammals that has been given the least publicity, and one that will no doubt be of interest to many, is our native Louisiana Beaver.

The Beaver, while not as plentiful as in years past, has managed to survive remarkably well, because of the fact that for twenty years or more the Department of Conservation, through its director of wildlife, Armand P. Daspit, has rigidly protected these animals by closed seasons and constant surveillance, so that today in the parishes of East Feliciana, St. Helena, East Baton Rouge and Livingston, along the Amite, and Comite Rivers and their tributaries, the Beaver continues to abide in large numbers.

Dr. Vernon Bailey, a foremost authority on the Beaver, says, "Beaver at one time inhabited the greater part of North America, and at one time, produced fur of greater value than that of any fur bearing animal. They were an important source of food and warm clothing, and the Beaver skin became a unit of barter with the Indians. Beaver fur soon attracted white traders and trappers, and traffic in the skins became an important commercial factor in promoting the early settlement of our country."

While in charge of trapping and transplanting live Beaver for the Department of Conservation, I had ample time to study the little fellow and his habits. Maybe I should not use the term "little fellow" for although the majority of beaver trapped were small, weighing from fifteen to thirty pounds, we nevertheless found some to weigh from forty to sixty-five and even eighty pounds.

■ Long leaf pine after being barked by beaver.

In my experience with the Beaver, I have found him to be, when not excited, usually friendly, in fact, in two or three days he can be hand fed and handled with comparatively little danger.

BEAVER CHARACTERISTICS

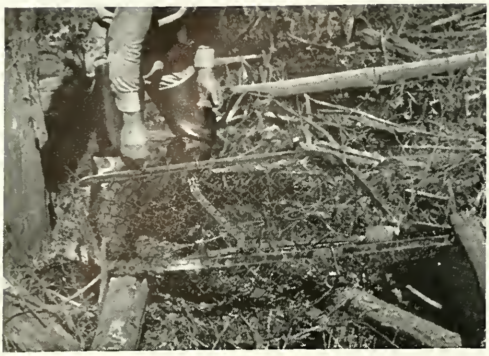
The Beaver is a rodent not unlike the Muskrat, except larger, with compact heavy body, acquatic and nocturnal in its habits. Its pelage is a soft dense coat of fine waterproof underfur overlain by course guard hairs, the color varying from light tan to almost black, the male being darker than the female.

One characteristic of the Beaver is its cleanliness. It can often be seen washing and combing its soft fur with the claws of its webbed hind feet, this being accomplished by the double combing claws which can be found immediately beneath the nail of the two inside claws. The fore-feet are also used in this operation.

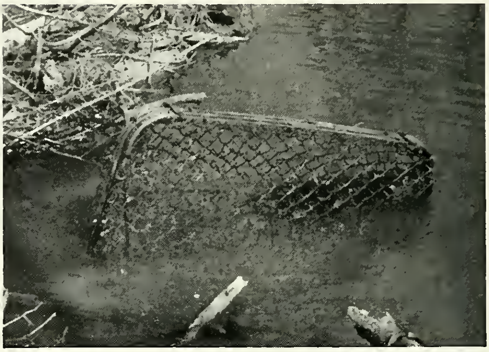
The thing most distinguishable about the Beaver is its tail; broad, flat and hairless, which has caused much discussion as to its use. Many believe it is used in transporting mud to be used in dam making. However, nothing has been found to substantiate this belief.

The writer, having transplanted live Beaver in various parts of the State, and having observed his many mannerisms in the various streams, believes you would understand the aquatic use of his tail if you could watch him with this appendage outstretched, swimming on top of the water, only to strike downward and submerge in the twinkling of an eye; then reappear, steering one way, then the other, in search of cover.

In order to give you a more complete description of the Beaver, let us again quote Dr. Bailey, "The Beaver has hind feet much larger than the front and the five toes are fully webbed for swimming. The smaller front feet are unwebbed and like the Muskrat are used for hands for



■ **Bailey type trap for trapping live Beaver. [Fig. 1.]**



■ **Trap sprung, showing head room. [Fig. 2.]**

holding food and give invaluable service for carrying and holding building material when dams are being constructed. The eyes are small and the vision is not very good except under water. The ears are short, lined with fur and valvular, closing as the animal dives under the water and opening the moment it puts its head above the surface. The sense of hearing possessed by the Beaver is remarkably keen. It also has a keen sense of smell, although the nostrils are small and valvular. Like the ears and nostrils, the mouth can also be shut so tightly that water cannot enter while the long front incisor teeth are being used to gnaw on roots beneath the surface and the molars or grinding teeth are used for chewing. The Tail on land has other uses, but in the water, it serves variously as rudder, propeller, and signal gun, its loud slaps on the surface of the water serving as warnings to friends or enemies."

THE BEAVER MENU

The question of food should not be overlooked, and, here again we find a similarity to the Muskrat. The Beaver being strictly vegetarian lives only on roots, barks and various plant life. His tastes, however, lean toward corn on the cob, green willow bark and roots, maple, aspen, and cottonwood. The Louisiana Beaver has been found to bark yellow pine and wild blackberry vines as well as numerous hardwoods. In Northern States, the Beaver lives in huts constructed with mud, grass, vines and sticks, and in winter this hut when frozen offers complete protection against marauding animals. However, the Louisiana Beaver seems content to build its home on the bank of a small stream, the entrance being below the surface of the water and extending upward toward the living chamber, which is above the level of the stream.

Let us not overlook his most characteristic trait, that of dam building. Nothing is more closely identified with the Beaver than his ability to construct dams. I have seen several built strong enough for three grown men to walk across, being over 100 feet long and made entirely of vines, sticks and mud. It is indeed remarkable to see the type of work these busy little fellows accomplish. Working from down stream, they begin at either side, working toward the middle until the stream is entirely blocked. They continue to pile on sticks, small logs, vines, and mud until the stream is entirely blocked; then they continue to pile on sticks, small logs, vines, sods and mud until the stream is raised to the desired level. Not only small twigs are used in this construction, but I have seen logs three to six inches in diameter and two to four feet in length woven into the dams so expertly that it is impossible for one man to pull them out.

Trapping the Beaver is, of course, strictly prohibited as they are fully protected by the State and the laws are rigidly enforced. However, the Department of Conservation has undertaken the task of thinning out some of the more congested areas and transplanting them to sections where they will enjoy more freedom and at the same time propagate in parts of the State where they have heretofore been scarce. All trapping is

■ **Transfer cage, showing live Beaver being transferred to holding pen. [Fig. 3].**

■ **Beaver being released in Tchefuncte State Park. [Fig. 4].**

■ **Type of Beaver dam found in East Feliciana Parish.**

done with live traps of the Bailey type (Fig. 1), placed in the stream in water deep enough that when the trap is sprung there is plenty of head room (Fig. 2) to allow the animal ample space to breathe.

After the Beaver is caught the trap and all are moved to the bank and the Beaver is transferred to a small transfer cage; then they are removed to a large holding pen where they are paired off and taken to their new surroundings, where they are released (Fig. 4). This, of course, requires much patience, for when freshly trapped the Beaver has to be handled carefully to avoid overexcitement.

The L. S. U. School of Geology Alumni Association

Another stride toward a more unified organization and closer relationships between the Petroleum Engineering Department, the School of Geology and the alumni of the respective departments of the Louisiana State University was realized on May 27, 1939. Approximately two hundred alumni and members of the faculty and graduate class assembled in the recently constructed geology building on the University campus. The occasion was held in appreciation of the accomplishments of Dr. H. V. Howe, Director, School of Geology. The graduates organized an alumni association consisting of both petroleum engineers and geologists. At the meetings the purposes and possible mutual benefits to be derived from such an organization were discussed. Much stress was placed on the cooperation that should exist between the geologist and the petroleum engineer. The association intends to keep on file the names and records of students graduating in geology and petroleum engineering that are seeking employment. This information is to be furnished to each alumnus. The problems and activities of the School of Geology, Petroleum Engineering and Louisiana Geological Survey were briefly outlined to the alumni by the members of the departments. The following alumni were elected to hold office for the coming year in the Geology School Alumni Association:

President: Rhyden B. Grigsby, Stanolind Oil and Gas Co., Lake Charles, La.

Vice-President: W. A. Alexander, Shell Petr. Corp., Lake Charles, La.

Sec'y.-Treas.: James H. McGuirt, School of Geology, University, La.

Prior to a banquet that served the dual purpose of honoring the director and initiating the annual alumni association meetings, a portrait of Dr. Howe was presented by the alumni and contributions from the graduate students, the Geological and Mining Society of American Universities, and the Alumni was presented to the University. These donations established a loan fund (H. V. Howe Student Loan Fund) that is to be administered by Dr. Howe and designated to aid students in completing their curricula. Excess funds resulting from the established annual dues are to be added to this fund.

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HORSE AND RIDER TRAVEL MORE THAN 3,000 MILES, SEEING AMERICA FIRST

Memories of horse and buggy days were evoked recently at Casa Grande National Monument, New Mexico, when a visitor arrived who had covered more than 3,000 miles on horseback. He had left his home, Signal Mountain, Tennessee, on the same horse that reached the prehistoric ruin one day less than a year from the date of his departure. Traveling by easy stages, as the spirit moved him, the equestrian tourist expressed his determination to see America first and thoroughly.

During the same month a British gentleman and his wife, traveling in a car bearing a London license drove into the monument. They had shipped the auto from their English home, and after a cross-country tour, were going on with it to see Australia.

Favorite Louisiana Recipes

By
Estelle Verjie Cottman

Any time is a good time to be in Louisiana, but the best time for gourmets to be in our fair State is during the hunting season. Our fine fishing season is more or less continuous; little fishes and big ones, too, are constantly swimming over the dam to tempt the Isaac Waltons to try their hand at a catch, but the good hunting in our woods and marshes during the late Fall and early Winter is something sportsmen dream about and have to come to Louisiana to realize. Until they have brought down some of our long-winged pintails, speedy mallards, green-wings and widgeons on a drizzly winter day in Louisiana marsh, they have not tasted the full flavor of duckhunting and still have a thrilling experience in store.

But this is definitely not to be a dissertation on the taking of game and fish. It only concerns itself with what to do with them after they are in the bag. At this point the ladies enter the picture!

It is a well known tradition that Louisiana women come into the world with a bunch of seasoning in one hand, a saucepan in the other, and the whole manual of Creole cookery tucked away in their clever heads. They are born cooks whether they be plebs or patricians. They are proud of their culinary skill, which is never shown to better advantage than in the preparation of game and fish.

Madame Begué was famous for her New Orleans breakfasts, which were more like heavy dinners. When it came to game and fish she had a way with them and her patrons had a word for her cookery which was "delicious!" Eugene Field wrote in her guest book,

> "I'm very proud to testify,
> The happiest of my days
> Is March 11, '95,
> At breakfast at Begué's."

Her turtle soup was a classic. This recipe is taken from her own recipe book:

Soupe a la Tortue

Choisissez une tortue de moyen grandeur; nettoyez la bien et coupez en petits morceaux. Faites frire un gros oignon, ajoutez une cuillerée de farine et faites roussir. Mettez la chair avec ceci, et laissez le tout roussir ensemble. Adjoutez des tomates et la quantité de bouillon requise, un verre de vin blanc et un de Medere. Assaisonnez au gout avec du poivre, quelques clous de girofile et un boquet composé de feuilles de laurier, de branche de thyme et de persil. A la fui de la cuisson, mettez deux cuillerées de sauce Anglais. et servez avec tartines de pain grillé.

Translated it reads:

Turtle Soup

Select a turtle of the desired size. Clean it well and cut in small pieces. Fry a large onion in hot lard. When done, add a spoonful of flour and let the whole brown nicely. Put in the meat and let it fry. Add tomatoes, the quantity of bouillon needed and a glass each of white and Madiria wine. Season to taste with pepper, a few cloves, and a boquet consisting of bay leaves, thyme and parsley. Lastly, add two spoons of Worstershire sauce and serve with toasted bread.

No other state can boast of more savory dishes than the Pelican state, whose Creole traditions may be traced to the French and Spanish cuisine and their adaptation of the American influence. Mrs. Cottman passes on a few of the distinctive and unique recipes with which she is personally familiar, with the implication that if Louisiana fails to tickle the palate of the most pernickety gourmet it is because he is suffering with acute indigestion.

Madame Begué has passed on but her name is placed high on the list of gastronomic celebraties never to be forgotten by bon vivants.

Wherever Louisiana women go their fame of delicious cookery follows them. Mrs. Allen J. Ellender, now a gracious Washington hostess, is noted for her Creole dishes. We give two recipes that are family favorites:

Louisiana Gumbo, a la Creole

1 lb. diced ham
1 lb. sliced okra
4 chopped onions
2 pods garlic
4 teaspoons flour
½ gal. rich stock or oyster liquor
1 large can tomatoes
24 large peeled raw shrimp or 2 cans
6 hard-shelled crabs or 1 lb. crab meat
24 raw oysters
Salt, pepper, thyme, bay leaf, parsley.

Fry ham lightly; add finely chopped onions, garlic, and flour and fry till light brown; add tomatoes and okra. Let simmer slowly in oyster liquor or stock; add seasoning, shrimp, oysters and crab meat or crabs cleaned and halved. Let cook gently for two hours. Serve hot with boiled rice, steamed dry.

Duck Stew and Turnips

1 duck, dismembered
1 large onion, chopped fine
1 pod of garlic
1 heaping teaspoon of flour
5 medium turnips, quartered
Seasoning of thyme, onion tops
Salt and pepper.

Let dismembered duck fry in pot until brown. Remove from pot and stir into same grease the flour, which must be browned to a dark roux. Add all seasoning except green onions. Add browned duck and cover with water. Simmer for an hour, then add turnips and green onions and cook slowly till tender.

Mrs. Harry D. Wilson has served many a meal featuring Louisiana fish and game. Our Commissioner of Agriculture has been an ardent hunter all his life, and one of his favorite dishes is baked rabbit which Mrs. Wilson prepares as follows and of which Mr. Wilson so characteristically asks, "oh, what is so rare as a well baked rabbit?"

Baked Rabbit

A pair of rabbits
2 finely minced onions
2 tablespoons minced ham
2 tablespoons butter
1 clove garlic, finely minced
1 sprig thyme and 1 bay leaf
3 sprigs parsley
1 tablespoon flour
1 cup mushrooms, chopped
2 cups water

Skin and clean rabbits, cutting in pieces at joints. Cover with cold water to which has been added 4 tablespoons of vinegar, and let stand over night. When ready to cook drain and dry well. Rub with salt, pepper and butter and place in a heavy baking pan and put in the oven for 15 minutes. Meantime, chop onion fine and put in iron skillet with melted butter. Brown lightly, add flour and brown well. Add minced ham and seasoning, let simmer a few minutes then add boiling water. Let come to a boil and pour over rabbit. Return rabbit to oven, bake slowly for 20 minutes, basting frequently.

Mrs. Bolivar E. Kemp is noted for her Southern hospitality. At her lovely home, "Sweet Afton", she frequently entertains in the same charming manner that endeared her and her husband, the late congressman, Bolivar E. Kemp, to their many friends. Two savory dishes that were often served during the hunt-

[Turn to Page 43.]

Geophysics In The Gulf Coast Area

By
Max Huyer*

The decade beginning with 1920 was a lean time for the geologist and wildcatter. The geologists discovered that the time-honored methods of exploration, based on surface indications and minute oil and gas seeps, were exhausted and new discoveries became more and more difficult. In 1923 a new science was introduced to the oil fraternity—the science of geophysics.

Practical or applied geophysics—as we designate the border region between physics and geophysics on one hand and practical geology on the other—has as its object the application of physical or geophysical methods of investigation to problems of practical geology.

While physics is the science of classifying phenomena of nature and establishing their laws, geophysics ascertains the physical properties of the terrestial body and its surrounding atmosphere and includes the study of continental drift, seismology, isostacy, the origin of the earth, atmospheric electricity, earth magnetism, gravitation and kindred fields. Applied geophysics uses the results of the study of geology and physics in solving its own problems and considers certain forces as objects subject to measurement because of their geological significance. It gives the geologist information regarding subsurface conditions which otherwise could be obtained only by drilling or excavation.

There is a certain similarity between the work of the geologist and that of the doctor of medicine—each has very often to be governed in his action by conditions which he cannot see. It is not necessary to detail the unseen conditions with which the geologist has to deal—the further extension of a structure, the existence of new ones, the throw of a fault, are a few of the conditions he has to determine as well as he can from deductions made from what he can observe. Probably less than half of human ills so manifest themselves at the surface of the body that definite and certain conclusions can be drawn. The diagnostician must observe various symptoms, and, from these observations, make his conclusions on treatment necessary for cure of the trouble. Both professions would be assisted immensely by any agency that would permit them to look below the surface, something that would make for a more certain diagnosis.

INTERPRETATION NOT INFALLIBLE

The physician has had such an agency since 1895 when Rontgen discovered the X-rays. What the X-rays are to medicine and surgery, geophysical prospecting methods are to the mineral industry. The result differs, of course, from the X-rays, in that no concrete picture results; it is only by long and painstaking experiment in the light of physical laws that the message can be interpreted. And while methods of interpretation can be taught, it can be made with the greatest degree of certainty only by those experienced in the practice of applied geophysics. Even then, just as with many instances in X-ray work, the interpretation is not infallible. There is still much to learn. However, with all their limitations, geophysical prospecting methods have become an important factor to the geologist in solving his most difficult problem—locating structures favorable for the accumulation of oil, or finding profitable ore deposits.

New techniques in prospecting for oil are in constant process of development. No field of exploration to-day is a more direct challenge to the scientific mind than the location of liquid "black gold" at increasingly greater depths.

Geological work depends almost entirely upon that which can be seen and directly measured. Geophysical work on the other hand involves indirect measurements with interpretation in terms of geology. The essential requirement for a successful geophysical survey is a close cooperation between the geologist and the geophysicist. For this reason any property which is to be surveyed by geophysical methods, should be thoroughly surveyed, topographically and geologically. All available data should be assembled before a geophysical crew starts its work. A geophysical crew is composed of trained technical men, an expensive group if employed in useless and unproductive work. Geophysical exploration methods are not intended to replace drilling and other prospecting methods. Their problem is rather to investigate and locate the regions most favorable for the application of the other methods.

LIMITING FACTORS

As in every form of research there are many limiting factors in the application of geophysical prospecting methods. At times the physical differences in the area under investigation may not be big enough to cause a variation in the field of force, or again, the necessary physical difference may exist but the sought-for deposit may be buried at such great depth that present-day instruments will not be able to measure the differences, or the mapped results may be so complicated in relation to known geologic conditions that an interpretation of the result is only a gamble. The geophysical methods in considerable use are four: The seismic, the gravimetric, the magnetic and the electric.

The record of these methods in prospecting has been brilliant—especially in the Gulf Coast area where the geologic structures favour the geophysicist more than in any other part of the United States. At the present time the instruments in use and the technique of observation have been developed much farther than the general knowledge of the interpretation of the result. Research is being done almost solely by commercial companies. Unfortunately there is no interchange of the results which would benefit the entire oil or mining industry. Therefore, for schools, both of pure and applied science, geophysics offers an interesting and almost untouched field of research.

LEGEND OF THE CHOUPIQUE

Some fishes, by their appearance, their movements or other behavior, have caused to grow about them a rich and interesting folk-lore. Such is the case of the Choupique, the 'book name' of which is the Bowfin. Our sole surviving member of a once great fish family, the Choupique has given rise to two curious legends in Louisiana. These are that if the Choupique is cooked, and thereafter left to stand over-night it will, by next morning, become raw again. The second, and more fantastic superstition, is that if a Choupique be wrapped in Spanish moss and buried with proper ceremony at the correct phase of the moon, it will, seven days later to the very hour, be found to have been transformed into a horrible water moccasin.

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* Geophysicist, Louisiana Department of Conservation.

■ This electric shovel is handling sulphur—the economic foundation of Port Sulphur and Grande Ecaille. Produced at Grande Ecaille by the ingenious Frasch "hot water" mining system, this "yellow magic" is so widely used in the United States today that statistics of its consumption are recognized as an accurate barometer of business conditions generally.

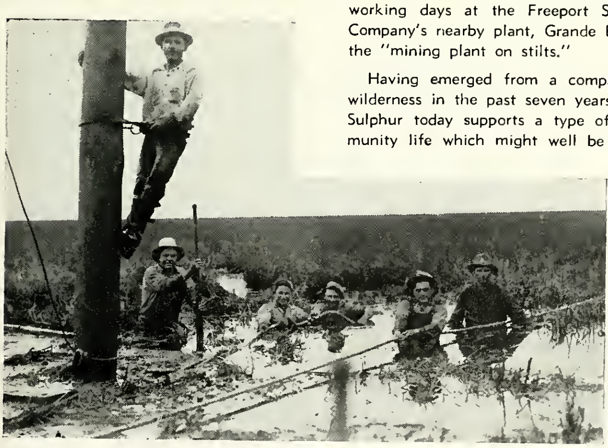
■ Modest in proportions, but so handsomely-equipped that New Orleans papers called it "the young doctor's dream of a perfect hospital," this hospital at Port Sulphur is the only one in Plaquemines Parish, and is used by all parish residents who wish to avail themselves of its facilities.. It contains 18 rooms—eight for patients. There are also examination, operating, X-ray, delivery and laboratory rooms, kitchen, doctor's offices, and a glassed-in sun porch.

A Model Industrial Community

By
Cyril K. Moresi

Among the grassy, cane-filled marshes that border Louisiana's southern shore along the Gulf of Mexico, on the bank of the Mississippi about 45 miles below New Orleans and four miles from the Gulf itself, lies one of the most unusual communities in America. This is Port Sulphur, home of those who spend their working days at the Freeport Sulphur Company's nearby plant, Grande Ecaille, the "mining plant on stilts."

Having emerged from a comparative wilderness in the past seven years, Port Sulphur today supports a type of community life which might well be taken as a model, in many ways, by the entire state. The physical foundation of the town is artificial land; economically, it is founded on sulphur, that "yellow magic" of industry which is produced in Louisiana and Texas—this Gulf Coast region providing more than a quarter of the sulphur requirements of the entire world.



■ This is the sort of "land" upon which Freeport Sulphur Company engineers constructed the piling-forest foundation of their Lake Grande Ecaille property, the "mining plant on stilts" where Port Sulphur residents work. Roads are non-existent in this part of the country, and Grande Ecaille operators commute to work from Port Sulphur by motor launch on a ten-mile canal.

Dotted by innumerable little lakes, crossed and re-crossed by countless bayous, the present site of the Freeport town and plant were until 1932 left for the most part to what were then its sole inhabitants—mink, muskrats and mosquitoes. That was before the completion of the Grande Ecaille plant, where sulphur is produced by the ingenious Frasch "hot water" process from the limestone caprock of deeply-buried "salt domes," a process regarded as one of the engineering marvels of America.

The application of this process, which involves melting sulphur from limestone crevices 800 to 1500 feet underground and pumping it to the surface in liquid form, presented what at first seemed to be insurmountable difficulties at Grande Ecaille. There existed no real foundation upon which to build a plant—nothing but swamps, quicksands and mats of decayed grasses floating on water or

■ **Modern homes of Port Sulphur employes.**

ooze underlain by sticky clay. Furthermore, Freeport engineers were not certain that the undertaking would pay. Although surveys indicated that there apparently existed sufficient sulphur to warrant a mining project, the only way to prove it was to construct a plant. The commercial value of the sulphur deposit subsequently was proved, but only after about $4,000,000 had been invested in equipment, dredging, drilling and land fills. This investment has since increased to $6,000,000.

FOREST OF PILINGS

Grande Ecaille, which is about ten miles inland from Port Sulphur, stands "on stilts". The entire property—including boiler houses, machine shops, pipe lines and water treating apparatus needed to implement the complex business sulphur mining—rests on a forest of pilings. The instability of the land is indicated by the fact that each of the piles, of its own weight, sank about 45 feet before receiving a blow from the piledriver. In placing these piles, workmen labored for a year waist-deep and sometimes shoulder-deep in muck, with the unsubmerged portions of their bodies assailed by clouds of mosquitoes.

Although it was not found necessary to construct a piling foundation for Port Sulphur itself, extensive land fills were used to raise the town's foundation above the maximum storm tide, which occasionally washed over the selected site. The mining area at Grande Ecaille can be reached only by a ten-mile canal that is the only means of transportation for men, materials and sulphur. Between Port Sulphur and Grande Ecaille, workers commute in high powered, stream-lined motor launches.

Port Sulphur's 600 residents benefit from community facilities unknown to many larger and long-established towns. Planned by Freeport executives, the town layout is spacious; garden space is provided adjacent to each house. There is a community house, theatre, library, well-run boarding house for single men, lighted tennis court, lighted baseball and soft-ball diamonds, and a modern hospital.

Many of these facilities are used not only by Freeport employes who live in Port Sulphur, but by residents of communities throughout Plaquemines Parish, in which the town is located. Through various social, educational and welfare associations, the community is closely knit.

THE COMMUNITY HOUSE

Focal point of social life in Port Sulphur is the community house which has an auditorium with a seating capacity of 600—large enough to hold the entire population of the town, if necessary. There are several small rooms for meetings and parties of small groups. The community house is regularly used for dances, meetings of community and parish groups and is the meeting-house for the Port Sulphur Church, each Sunday morning. For the younger members of the community, the community house is supplemented by a park and children's playground located in the center of the town, equipped with a wading pool, swings and see-saws.

In the community house, and at the school, are held meetings of the Parent-Teacher Association, the 4-H Club, the local "Future Farmers of America" group, the athletic association and the very active camera club. The community house is also the meeting place for the local theatre guild, organized in May of this year. This group, which presents its first play in May, has already attracted considerable attention throughout the parish.

The Port Sulphur library, which was only recently organized by the women of the town as a community house activity, has already reported weekly circulation of about 80 volumes. At the present time, the library is being used almost exclusively by residents of the town, but an invitation to take advantage of the library facilities has been extended to parish residents in general. The policy of linking together community-parish activities of all kinds was inaugurated in the first year of the town's establishment in 1934, with a Christmas Tree celebration for all Plaquemines residents. A similar party has since been held at Yuletide of each year.

Port Sulphur's hospital, the only one in Plaquemines Parish, was opened in

■ **The community house at Port Sulphur, Louisiana, center of social life in one of the most unusual towns in the United States. The entire community, home of those who spend their working days at the adjacent Grande Ecaille plant of the Freeport Sulphur Company, is on artificial land set in the midst of swamps and bayous. In existence only since 1933, this town has risen from the heart of what was almost a wilderness to become a model for community life throughout the state.**

February of last year on what was then a new section of the town where a number of new homes were being erected. Entirely modern in every respect, its architecture is of a type similar to that of the homes, a low frame structure with simple lines. There are 18 rooms; eight for patients and two for doctors' offices. In addition, there are two reception rooms, an examination room, X-ray room, laboratory, kitchen, utility room and a glazed sun porch which in an emergency can be converted into a ward.

A MODERN HOSPITAL

The hospital is heated with a modern, thermostatically controlled oilburning hot water system, with cabinet type radiators in each room. Equipment includes electric sterilizers and X-ray apparatus, and attic ventilator fans. The building is completely screened with non-corroding aluminum wire screens. To facilitate hospitalization for Port Sulphur residents, a medical aid association for all employes has been organized.

Port Sulphur is highly sports-conscious. The large soft ball diamond is today the most popular sports center, and is used day and night. A regular schedule of games has been planned among teams from Port Sulphur, Belle Chasse, Pointe a la Hache, Empire, Buras and a group representing the Humble Oil Company. All of these groups have both men's teams and womens' teams. Another league made up of teams from various departments at the Grande Ecaille mine, also plays a regular schedule. All of these games are well attended and create considerable interest both locally and throughout the parish.

The first six-man football team in the state was organized in Plaquemines Parish in 1938 and played a regular fall schedule. The Port Sulphur school was instrumental in creating interest in this relatively inexpensive game. Towns represented in the gridiron league include Port Sulphur, Belle Chasse, Braithewaite and Buras. This summer, as usual, Port Sulphur is represented by a baseball team which usually plays one game each week on the home diamond. Sports of various kinds are on the regular schedule of the boy scouts and girl scouts of the town, with two active troops participating in regular scout practice. However, today Port Sulphur's social and economic pattern of life is well established and well conditioned by the initiative of public-spirited residents, but the Freeport company management continually cooperates with the townspeople in furthering community projects.

In sulphur mining the plant operators themselves are not typical representatives of the mining group composed largely of coal and metal miners. Grande Ecaille miners do not descend with lamp and pickaxe into the bowels of the earth. On the contrary, they get so much sunlight—direct and reflected from the enormous glistening yellow piles of sulphur which accumulate by the hot water technique—that dark glasses are part of the standard equipment of each miner.

■ **Community playground at Port Sulphur.**

To a considerable extent, work at the plant is done through use of automatic devices checked by skilled technicians. The 99.5 per cent pure elemental sulphur mined by the Frasch method at Grande Ecaille and other gulf coast plants is produced under working conditions which are as ideal for the men as any which exist in the United States.

One aspect of the interrelationship between community life and life at the mine is illustrated by the methods employed in the plant "safety" campaigns. Although there are relatively few dangers in sulphur mining, compared to the majority of industries, it is the aim of the Freeport management to reduce these few to an absolute minimum. Some hazard derives from the fact that plant operators are responsible for the handling of great quantities of hot water, steam, gas and molten sulphur. Also, the men must handle heavy machinery, derricks, pipes and other equipment.

Instead of using high-pressure safety campaign methods, the Freeport management utilizes the "psychology of amusement" to hold injuries among employes to a minimum. Under the system successfully developed here, the local theatre is rented, a good motion picture secured, and invitations are extended to all employes and their families and friends.

During the course of the evening, safety awards are distributed and brief speeches are made calling attention to the fact that the gathering is in the interest of safety. Motion picture shows are periodically replaced by vaudeville and other forms of entertainment. Recitals of accident statistics and "pep talks" are avoided. Development of individual initiative is the theme stressed by these gatherings—the aims of which are further promoted by customary measures including safety inspections, first aid training and maintenance of safety engineers.

SAFETY MEASURES

Results of this type of safety campaign —as pointed out in an article by A. H. Schroder, safety director of the Grande Ecaille plant, appearing in a recent issue of the National Safety News—have been salutory. On a basis of man-hours of work lost, frequency of accidents has decreased more than 60 per cent since 1934 and severity of accidents nearly 80 per cent. Similar methods, incidentally, have brought beneficial results at this company's plant at Freeport, Texas, where operations have been carried on for more than a quarter-century.

Grande Ecaille and Port Sulphur are soundly established and the people are forward-looking. While the town has no company-owned stores or commissaries, it is already highly self-sufficient. It has a drug store, a grocery store, a meat market, a theatre and a post office, two doctors, a dentist and three churches. The only unit not self-contained is the office of the general manager. This office which has a personnel of 38 people, is located in New Orleans, where it was established in August, 1932.

Supplies for both mining plant and the model community are today brought in by boat, by the New Orleans and Lower Coast Railroad, and by highway from New Orleans. The same transportation facilities are used to ship out the material that has made the town and plant

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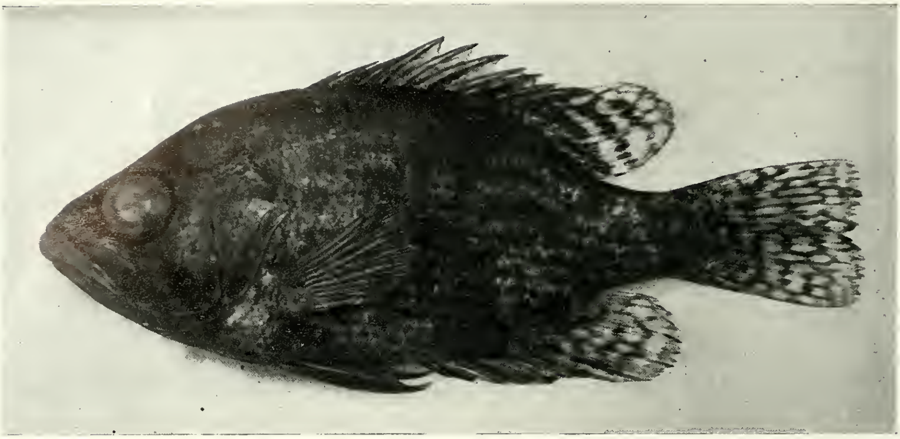

■ **Fig. 1. THE SOUTHERN ROCK BASS, *Ambloplites ariommus*. A retouched photograph showing the big eyes, depression on top of the head, and the pattern of spots and blotches which distinguish this from the northern species.**

WHERE TO FISH IN LOUISIANA

•

For the Southern Rock Bass

•

By
Percy Viosca, Jr.

"The mystery fish" would be an appropriate title for the black goggle-eye of "Louisiana." Rare in museum collections, it is known mostly from specimens collected by the writer in creeks of St. Tammany Parish in this state and in a few streams in Mississippi and Alabama.

So little is known about this fish, it is difficult to do justice in this issue to the title of our column. So, instead of telling our readers where to fish for it, such knowledge as is at present available will be presented and perhaps some of the many anglers among our readers, who may have stumbled upon it, may impart their valuable knowledge to us.

The "Southern Rock Bass," which should be the correct name for this fish, was described by the writer as a new species in a technical paper only three years ago.[1] Even Jordan and Evwemann overlooked it, although seven young specimens collected by them in the Tangipahoa river repose in the National Museum. These were believed by them to be the Northern Rock Bass whose range was then thought to extend to the Gulf Coast. For years the northern species appeared on the lists of southern fishes. As far as we know today, the northern species is not native south of the Missouri and Tennessee river systems.

A good retouched photograph of the new bass is presented herewith. Instantly noticeable are the large eyes which remind one of a deep sea fish, hence the Latin name *Ambloplites ariommus* (big eye). The head is large and thick, which gives the fish a bull-headed appearance. It also has a conspicuous depression above the eyes.

The predominant color in the new species, especially when viewed from above, is black. Between the black markings is an olive ground color which blends into straw or oyster white on the underside. The reflections from the scales above are usually metallic green, whereas those on the sides are usually green gold or old gold, although a pearly iridescence of a bluish or pinkish cast appears from some angles to the light. Pale specimens, especially young ones, may appear olive or greenish instead of blackish, and it is possible the species may vary in color in different waters as other fishes do.

The dark markings are conspicuous and appear as dots, spots, and black shadowy cloudings. A single somewhat triangular black spot is usually visible on each body scale. These spots are connected by lighter bars, giving the fish the appearance of a striped bass were it not for the shadowy cloudings which obscure them. The shadowy markings vary considerably, but most conspicuous is an area below the middle of the back fin. This generally outlines roughly the form of an hourglass, a crescent, or a maltese cross covering more or less the third quarter section of the side of the fish.

The upper parts of the head are black, the lower parts white and black. The eyes are marked with black, scarlet, and silver, the pupil itself being black.

The southern rock bass, thus adorned, seems to be perfectly camouflaged against the black stained logs and debris of its environment. It is difficult to see it under water except when it turns belly up. It possesses chameleon-like powers and may be dark one minute, pale the next, and dark again a moment later. Thus far it has been found only in spring-fed streams of extreme western Florida, Alabama, Mississippi and East Louisiana. It is up to West and Nortn Louisiana anglers to produce records from those areas if it occurs there. I have searched for it west of the Mississippi River without avail.

Stomach examinations show that this rock bass feeds on bottom insects, small fish and crawfish and it may be almost entirely a bottom feeder. Bait species inhabiting swift riffles were not found in any of the stomachs examined. Although the streams in which the strange fish is found contain gravel, there are no large rocks in most of its known range; therefore, although technically called a "rock bass" it has to be satisfied with stumps instead. It is apparently a very secretive fish, probably hiding deep in the holes and shadows. The large eye might indicate nocturnal feeding habits, so we may be missing a bet by not fly fishing at night with bottom flies. (You're certainly good if you can do this.)

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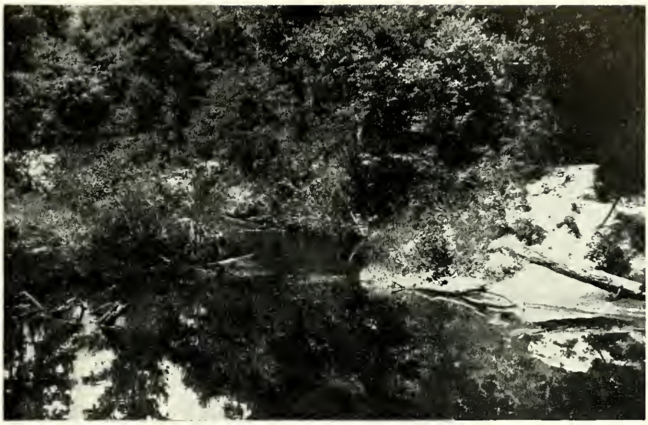
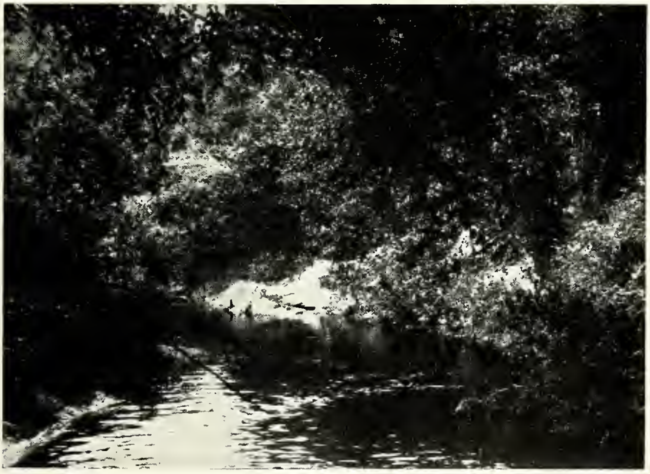
[1] Copeia, No. 1, May 10, 1936.

The largest specimen of record is a 7½ inch male specimen taken in Boley Creek, near Picayune, Miss., was 6 summers old, and weighed 4½ oz. Small as it is, it is a first quality food fish as its flesh is firm, flaky, of delicate texture, and fine flavor, exceeding the smallmouth bass and bluegill bream in quality. The chief associates of the new bass are the long-eared sunfish and the southern smallmouth bass.



■ Fig. 2. LITTLE BOGUE FALAYA CREEK, 3 miles north of Covington, Louisiana, the stream in which the type series of *Ambloplites ariommus* was collected. In the left foreground is a "deep" hole with many stumps, the habitat of the new species. A "making" bank to the right shows the sandy nature of the soil. The dense forest in the little valley consists of such trees as spruce pine, *Pinus glabra;* water oak, *Quercus nigra;* southern magnolia, *Magnolia grandiflora;* black willow, *Salix nigra;* black titi, *Cliftonia monophylla;* holly, *Ilex opaca;* river birch, *Betula nigra;* and many others.



■ Fig. 3. BIG BOGUE FALAYA CREEK, 6 miles north of Covington, Louisiana, a typical Gulf Coastal Plain creek. In the left foreground is a sandbar and riffle area, in the distance, deeper water. The overhanging trees make fly fishing difficult. The Southern smallmouth bass, *Micropterus pseudaplites*, is the dominant species in streams of this type, associated with the long-eared sunfish, *Xenotis megalotis*, in the shallows and with *Ambloplites ariommus* in the holes.

◆

A Model Industrial Community

[Continued from Page 23]

possible—sulphur, many thousands of tons of which go each month to the countless industries which depend upon this element as an indispensable raw material.

Sulphur is so widely used today in the United States that statistics of its consumption are regarded as an index of business conditions generally. Products depending upon sulphur at one or more stages of their passage from raw material into daily use range from airplanes, alcohol and alum to drugs, explosives, hats, steel and other metals, movie films, rubber goods, paper, soap, sugar and many others.

This yellow magic is equally useful to the farmer. Either as spray or dust, by itself or in combination with other materials, sulphur has a constantly widening range of usefulness in controlling agricultural pests from weeds to weevils.

Each year sees American industry introducing new products and new processes of conversion—and sulphur and its derivatives often play a vital role in this development. Hence Grande Ecaille and Port Sulphur, and the other sulphur-producing properties of Louisiana and Texas, play an ever greater part in establishing the Gulf Coast region as one of the nation's most prominent suppliers of raw materials.

◆

THE GROUND-HOG

A choice bit of American folk-lore credits the woodchuck or ground-hog with being a foreteller of weather. According to the familiar tale, if he comes out of his den on the second of February and does not see his shadow, the weather will continue mild and early spring is at hand, but if he sees his shadow he returns for another six-week's nap for a late spring is due.

The fact of the matter is, woodchucks do not see daylight until late March or early April when their winter hibernation ends. On rare occasions they come out late in February for long nocturnal journeys across the snow.

The reason for these meanderings is not known, but they appear to be searching for food. Whether they are out for a purpose, or merely sleep walking is not certain, but we may be sure they are not qualifying as weather prophets.

◆

Franklin designed an improvement for a pleasure-fishing boat.

◆

In 1734 New York City ordained the first statute limiting the manner of fishing to the use of rod, line and hook.

■ **Lake Charles Garden Club window display of wreaths without holly.**

Help Save The Holly!

By
Mrs. N. William Reed

President, Louisiana Garden Club Federation.

Did you hang a holly wreath before your door last Christmas? That is the question which the garden clubs of the state are asking. And, if you did, have you ever stopped to think how wantonly and quickly our native holly is being destroyed?

Nature lovers, eager to preserve the holly in Louisiana, are seeking the aid of all thoughtful residents within the state. The Louisiana Garden Club Federation sponsored a bill, which was enacted into a law, making it unlawful to pick the holly.

But what can we use in the place of holly to lend a festive note to the holiday season? The Lake Charles Garden Club has attempted to provide suitable substitutes by appealing to the originality of its members. At the Calcasieu-Cameron Fair in October, 1938, one of the members of the club displayed a Christmas wreath of greens in which no holly was used. This wreath created so much interest that in December the Lake Charles Garden Club conducted a "Save-the-Holly" wreath contest and awarded prizes for the most attractive and appropriate wreaths submitted—wreaths fashioned of many greens except holly. Forty-five wreaths were entered in the contest. Some were large; some were small. Some were quite elaborately decorated; some were marked by simplicity of design. Twigs of many species of shrubs and trees were used: ligustrum with its berries dipped in red, balsam, box elder, pine, cedar, camphor, bamboo, magnolia—even mistletoe and creeping juniper. Pine cones, gum-balls, acorns, cranberries, grapes, or various leaves and berries dipped in red or silver, became fitting substitutes for holly berries.

Thus the first step in Southwestern Louisiana has been taken to attempt to preserve our native holly. All nature lovers are urged to cooperate with the garden clubs of the state in this attempt.

* * *

PASSENGER PIGEON SAUSAGE

The following letter provides an interesting picture of one of the prodigious Passenger Pigeon flights in the Mississippi Valley, quite possibly one of the last recorded:

Clayton, Missouri,
June 20, 1939.

Editors,
Louisiana Conservation Review,
New Orlenas, La.

Gentlemen:

May I express my appreciation of the very fine article in your recent Spring issue of Conservation Review, entitled "Vanished Americans", by James Nelson Gowanloch.

I have long wished to read an authentic treatise on the subject of the Passenger Pigeon, for the reason that as a boy and up until I left the farm as a grown man, I slept much of the time on a feather bed plucked from the breasts of Passenger Pigeons killed by older brothers and my father during the last mass migration or flight, which occurred some five years later than the last date mentioned by Mr. Gowanloch referring to the large number of men engaged in pigeoning in 1879.

This flight occurred the winter of 1883-4, soon after my father had settled in Poinsett County, Arkansas, at a small station on the Cotton Belt Railroad, named Weiner. As related by my father on countless occasions, it seems that the pigeons arrived by the millions in one day. On the first night of their roosting, my father and two older sons, with two neighbors, went out with lanterns and wheat sacks. They brought the sacks home filled with the birds which they tapped on the heads with sticks. The hight point in this exploit, as often heard related to incredulous listeners, was that one of my brothers picked the birds off the bushes with his hands and stuffed a three bushel sack with live birds which he allowed to suffocate.

In one roosting place large oak trees which later adjoined our farm, bore evidence of limbs being stripped by the weight of birds, and I have heard it stated that in flight the pigeons often had the appearance of a cloud. Within a day or two after the arrival of the birds the professional hunters followed and paid the few local hunters who lived in the community 25 cents a dozen. My family did not shoot birds for the market, but instead picked the breasts which were ground into sausage and made a feather bed of the feathers.

In all of the many discussions relating to this mass flight which I heard in later years it was always stated that the pigeons were never heard from after they left Arkansas that winter. Their disappearance was regarded as a great mystery. A theory was advanced that they may have attempted a mass flight across the Gulf of Mexico and perished in the attempt. On a few occasions as I was growing to manhood an older brother and I noted flights of perhaps fifteen to twenty-five birds which he declared were Passenger Pigeons. They never alighted and seemed to be prospecting from the manner of their actions.

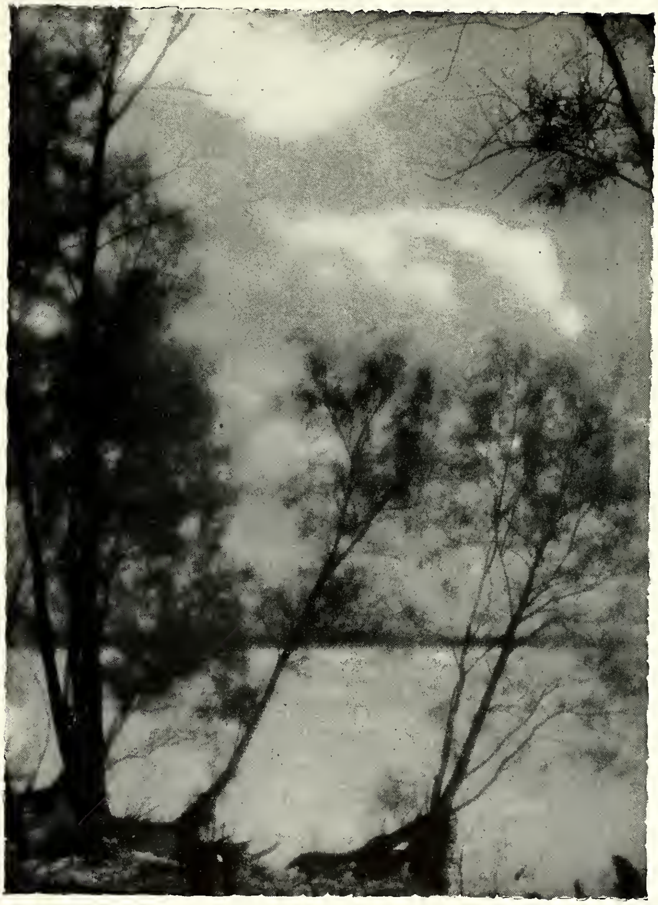
The above information is submitted in the belief that it may supply some additional data on the history and final disappearance of this magnificent "Early American".

Yours very truly,

I. D. Walter.

Lovely Louisiana

PHOTOGRAPHIC STUDIES BY DELCROIX



UPLAND LAKE ....

.... throughout the length and breadth of Louisiana we come upon these placid lakes, which mirror silver clouds in their translucent waters .... a faint breeze stirs the whispering leaves .... no rattle of sabre here or thunder of marching feet ....

Lovely Louisiana

WOODLAND SCENE . . . .

. . . . a Sunday afternoon stroll through these country woods renews our faith in old beliefs, brings a nostalgic longing for the innocent dreams of childhood . . . . here Nature is busy with her miracle of reproducing life . . . . the mating call of bob white is heard through the underbrush . . . .

Lovely Louisiana

ROAD TO LAFITTE'S RENDEZVOUS . . . .

. . . . bordered by live oaks whose overhanging limbs are festooned with Spanish moss, this road to Lafitte's rendezvous is typical of the picturesque by-ways of South Louisiana . . . . through the lush undergrowth one may glimpse the dark waters of the adjacent swamp, teeming with wild life disturbed only by the occasional hunter or trapper . . . .

Lovely Louisiana

SUMMER . . . .

. . . . here Nature weaves her magic haze of illusion over land and water . . . . the lazy spell of our noon-day siesta yields to the soft embrace of cooling shadows, the calm meditation induced by solitude . . . .

Lovely Louisiana

. . . . here are colors for the artist's palette . . . . bright greens and dark purples, touched by flecks of golden sunlight that filter through the foliage of overhanging boughs . . . . banks of a Louisiana bayou that wanders sleepily about, unhurried by the wheels of commerce . . . .

LOUISIANA BAYOU . . . .

Lovely Louisiana

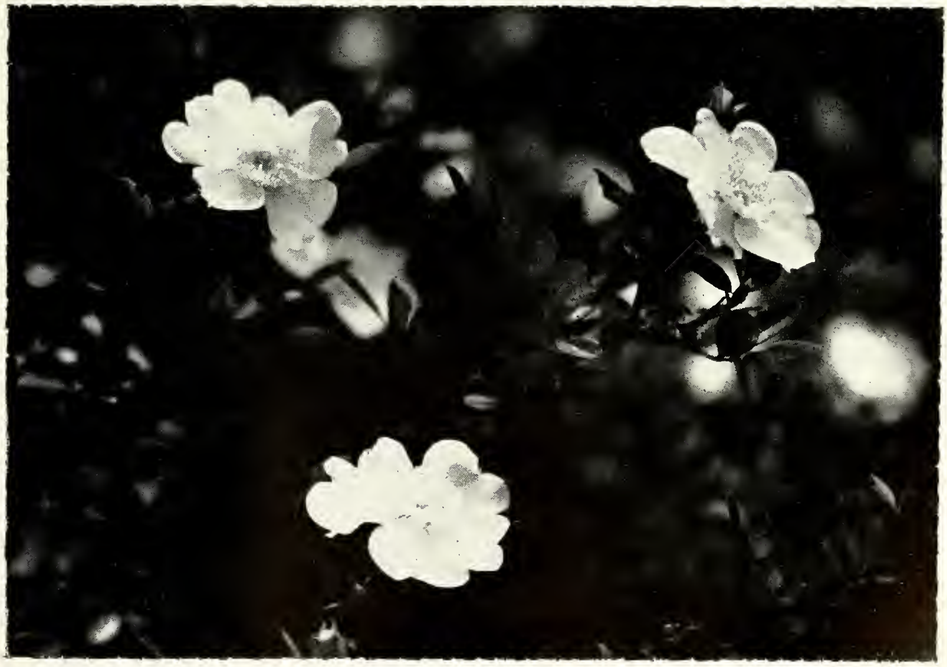
OAK GROVE NEAR NEW ORLEANS....

....Louisiana's oak groves are reminiscent of a golden age in her history.... the grand approach to a stately plantation home, the steamboat whistle at the landing, the plantation bell that summoned the darkies from their quarters....

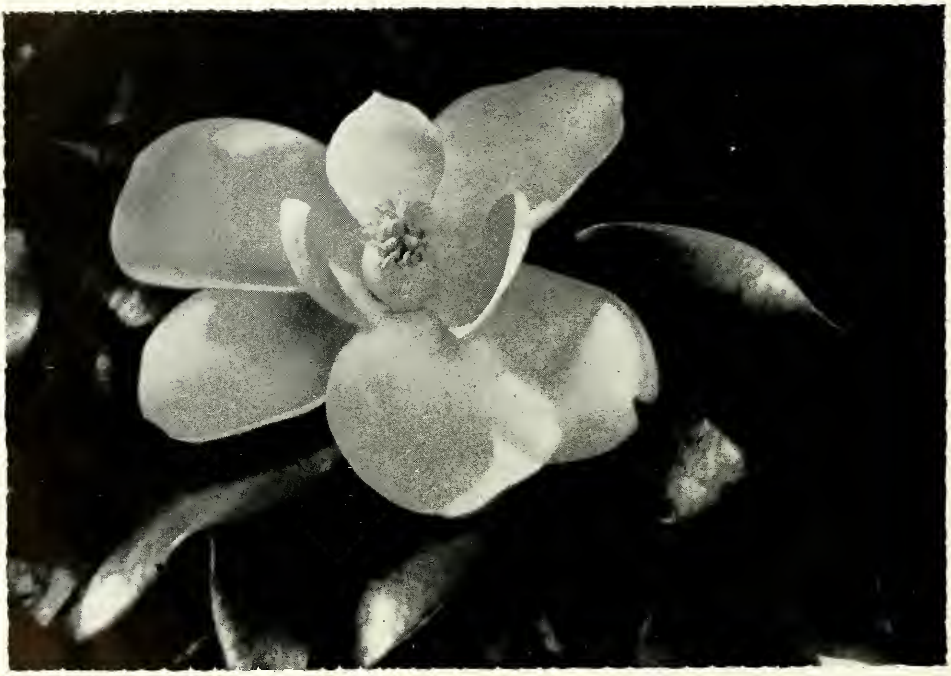
Lovely Louisiana

. . . . in pale and abundant beauty the Cherokee Rose spreads its rambling growth over the roadside fences . . . . for many its white and simple flower matches in interest and charm the finest products of floricultural ingenuity . . . . yet few Louisianians know that the Cherokee is not Louisianian at all but a flower brought to the Deep South from far away China to find here a home whose April and May loveliness its blossoms so charmingly enhance . . . .

CHEROKEE ROSE . . . .



Lovely Louisiana



MAGNOLIA . . . .

. . . . wax-like against the dark glossiness of its evergreen leaves, the Magnolia flower reveals the full beauty that justly won its choice as Louisiana's State Flower . . . . redolent with the romance and mystery of the Deep South, it has become an integral part of that rich and lovely pattern, at once compelling and ineffable.

What Palms Grow In Louisiana

By Miriam L. Bomhard

PART VI

The fan-leaved (palmate) palms[1] are represented in Louisiana by 9 genera: *Chamaerops, Erythea, Livistona, Rhapidophyllum, Rhapis, Sabal, Serenoa, Trachycarpus*, and *Washingtonia*. The washingtonias (*Washingtonia* spp.) are the most widely planted in Louisiana as well as in the palm-growing regions of the United States.

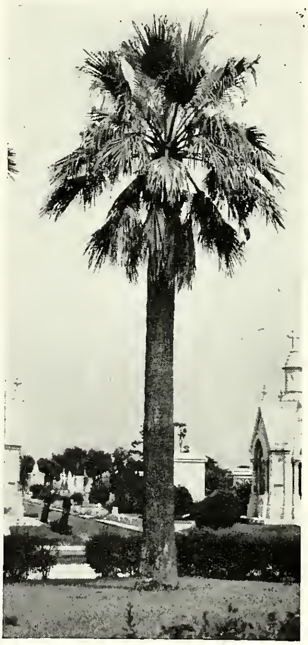
Washingtonia Wendland. *Washingtonias.*

Distinguishing features: Tall, fan-leaved palms up to 60 ft. and more; trunk more or less ringed and longitudinally furrowed, boots soon split, giving a crisscross effect on young trees; leaves with threadlike filaments in the clefts and on the margins of the segments (at least when young), primary segments soon divided; hastula rather flat, triangular, wing-margined at first; flowering stalks (spadices) equalling or extending beyond the leaves, with hanging main branches; fruits small, ovoid, black berries; seeds solitary, grapelike.

The genus is named for George Washington.[2] Washingtonias are native to southern California, Arizona, and northwestern Mexico. There are two recognized species: California washingtonia (*W. filifera*) and Mexican washingtonia (*W. robusta*), both of which show variation in native groves as well as in cultivation. For convenience, the California species may be described as the "stout" washingtonia in contrast to the "slender" Mexican species; that is, the trunk of the former (Fig. 39) appears to be a solid column of about equal diameter whereas the latter (Fig. 40) has a more slender trunk, wider at the base, from which it gradually tapers into a shaft considerably narrower than any part of the trunk of *W. filifera*.

Both washingtonias are handsome avenue trees and are cultivated in many parts of the world. Impressive plantings may be seen in nearly every town from the latitude of Opelousas and Baton Rouge southward. The Mexican washingtonia is the most commonly cultivated species; in New Orleans, rows of 100 to 150 trees of this palm line some of the principal avenues.

Washingtonias are fairly hardy palms —they usually recover remarkably from occasional cold weather and also withstand the ravages of fire. But apparently none of them survived the all-time low temperature for Louisiana of 6.8 degrees above zero in February, 1899; those now growing in the State were set out since that date. Washingtonias are much more gracefully proportioned when the dead or dying leaves remain hanging to the trunk, forming a sort of "shag" as they naturally do in the wild. No doubt the dead leaves do represent a fire hazard in cities but it should also be remembered that they protect the bud against unfavorable weather conditions. Besides, frequent trimming lends a most inartistic and unnatural appearance to the trunk.



■ **Fig. 39. California washingtonia (W. FILIFERA). Metairie Cemetery, New Orleans.**

The young plants of both species are very attractive and effective anywhere but they should be set out with a view to the landscaping effect when they are older, for washingtonias make rapid growth. Moreover, here we have a genus of palms which changes character from youth to maturity. Until they are about 10 ft. tall, they are characterized by a compact growth of medium-sized, glossy "fans". The blade of the leaf is in one plane, held stiffly erect, and the primary segments are only slightly divided a second time; a long fiber dangles in the cleft of each segment and the edges and tips of the segments appear to be ravelling out (Fig. 41). The petioles are margined with horny, yellow to brownish, claws or hooked teeth. The hastula is wing-margined. The trunk is covered, except at the very base, by a latticework of boots, since the leafbases split from the bottom upwards to accommodate themselves to the increasing diameter of the trunk. The fibrous leafsheaths may be seen "stuffed in" behind the boots.

In older trees, the leafblades, because of their increased size and weight, are no longer in one plane, the primary segments are more deeply divided and droop gracefully, and the filaments have worn away or, at least, are not conspicuous. In the upper part of the petiole, the claws may have disappeared or become reduced to low teeth. As the boots fall off, the checkered bark of the trunk is revealed, marked by horizontal partial rings as well as lengthwise fissures or cracks.

It is a pity that washingtonias do not bloom when they are young because all the stages in flowering and fruiting are remarkably interesting—from the first appearance in the midst of the leaves of the erect, flowering stalks each with several whiplike branches (all tightly covered by the overlapping spathes) to the stage when the branches hang down from the main axis and the spathes unfurl one after another to release the showy flower clusters (Fig. 9, Part I). The papery-white, perfect flowers, from 1/3 to nearly 1/2 of an inch high, are borne in quantity and have, especially in the Mexican species, a sweet odor. *W. robusta* flowers in May or June, about a month earlier than *W. filifera*.

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[1] Part I should be consulted under the subtitle "The Fan-leaved group" for explanation of the fan type of leaf.

[2] Mr. Charles W. Eichling, Sr., the well known New Orleans florist and palm-enthusiast, traveled for a seed firm in Germany in his youth. He tells me that he knew Hermann Wendland, who described the genus, *Washingtonia*, and also well remembers the interest shown in the first specimens of washingtonia plants exhibited at various expositions in Europe in the 1870's.

The fruits, ripening in the autumn, are black berries, about 1/3 of an inch long (Fig. 42). They have a thin skin, a narrow sugary layer of pulp, and then an inner shell which encloses the solitary, grapelike seed. Birds are very fond of the fruits. The Indians used those of the California washingtonia for food.

W. Filifera (Linden) Wendland. *California washingtonia.*

(The names, *Pritchardia filifera, P. filamentosa, Brahea filifera, Neowashingtonia filamentosa*, and *W. filifera* var. *robusta* are synonyms and their use should be discontinued. *W. arizonica* is also to be referred to *W. filifera*).

> Trunk a stout column of about equal diameter throughout, vertical cracks more prominent than the leafscars; crown "open", leaves not permanently woolly on under side, undivided part oblong or round-rectangular in outline, mature blades held at an angle, segments at tip less drooping than those at sides of blades; branches of spadix usually 2 (sometimes 3, even 4).

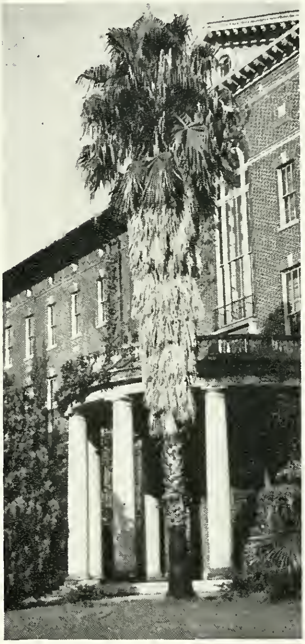
Filifera means "thread-bearing" and refers to the fibers or filaments of the leaves. This name does not particularly distinguish this species from *W. robusta* since young leaves of both are very filiferous. However, the California washingtonia was described first and the filaments are more likely to be retained in older leaves of this species.

The California washingtonia (Fig. 39) is the only palm native to the western United States. It grows in rocky, sandy stream beds in canyons and in sandy, alkaline soil about springs in the desert regions of southeastern California, adjacent Yuma County, Arizona, and northern Lower California. A true desert palm, it occurs in groves, forming almost pure stands, or as scattered individuals. It naturally grows in the interior, which probably accounts for its occasional failure under cultivation in some (too moist) coastal regions. Unfortunately, there has been a sudden loss of many mature palms of this species in Louisiana within the last five years, especially in New Orleans.[3]

I consider the California washingtonia to be the handsomer of the two species. I like its magnificent sturdiness. To be fully appreciated it should be seen growing wild—its whole aspect is so much in keeping with the rigorous conditions to which it is so well adapted. Excellent specimens are easily accessible in the famous Palm Canyon, near Palm Springs, California, at the base of the San Jacinto Mountains.

This massive palm attains up to 60 ft. (probably more) in height; there is a considerable number of these palms in Louisiana which are 45 or 50 ft. tall. Although the trunk *appears* to be of equal girth, the diameter of our specimens averages 3 ft. at the base and about 9 inches less at 5 ft. above. The bark is grayish brown (lighter under desert conditions), rough and checkered with the longitudinal fissures or cracks prominent. The boots are lost much earlier than in *W. robusta.*

This species has an "open" crown; that is, the petioles are usually longer than the blades and hold them out farther from the tree. Besides, the mature blades are held in a semi-erect position so that, viewed from below, the oblong, undivided portion is quite apparent. The blades are up to 6½ ft. across; there are 58 to 78 primary segments. The triangular hastula (Fig. 43) is longer than in the Mexican species. The loose wool here and there on the under surface of the leafblade soon disappears. The reduction or complete absence of teeth or claws in the upper part of the petiole seems to be more characteristic of this species than of cultivated Mexican washingtonias.



■ **Fig. 40. Mexican washingtonia (W. ROBUSTA). Newcomb College, New Orleans.**

The flowering stalks of Louisiana specimens average about 12 ft. in length, but I have measured longer stalks on wild trees. The lower 4 ft. or more forms a sort of "handle" and is covered by three enveloping spathes. The first long (8 to 10 ft.) branch comes from the fourth spathe. The usual arrangement is 2 long drooping branches hanging, rather widely separated, from the main axis. In southern Louisiana, the flowers appear in late June and July. The fruits average nearly ½ of an inch in length.

W. Robusta Wendland. *Mexican washingtonia.*

(The names, *Neowashingtonia sonorae, W. filifera* var. *sonorae, W. gracilis*, and *W. sonorae* are to be referred to *W. robusta*).

> Trunk wider at the base, tapering into a slender shaft, horizontal leafscars obvious; crown fairly "closed", leaves with persistent patch of wool on under side, undivided part nearly circular in outline, mature blades held more or less horizontally, the segments drooping about equally all around the margin; petiole bases reddish brown; branches of spadix usually from 5 to 8.

Robusta refers to the vigorous character and rapid growth rate of this species. It grows faster and becomes taller than the California species. Measurements of several plants over an 11-year period showed an average growth of 2½ ft. per year. The Mexican washingtonia (Fig. 40) inhabits stream beds and canyons near the sea in Lower California and Sonora (northwestern Mexico). It is well adapted to southern Louisiana conditions, probably because it is naturally at home in coastal regions. This palm is known to attain 80 ft. in height, but we have none so tall. The diameter of Louisiana specimens is about 2½ ft. at the ground line and averages 1 ft. at 5 ft. above. Several years ago someone decided that the beautiful row of these palms on City Park Avenue in New Orleans was so tall (about 40 ft. at that time) that the palms constituted a menace to public safety! I gave assurance that as long as these trees were in healthy condition, it would be a great mistake to remove them. As an example, I mentioned a famous avenue of these palms in Los Angeles which are nearly twice as high and still thriving.

The bark is brownish gray, rather smooth, and with the leafscars much more obvious than the longitudinal cracks. The leafbases are decidedly reddish brown and the crisscross pattern is characteristic of young trees (Fig. 44). It is not uncommon to see sets of boot areas with bark between on older cultivated trees; the old boots are pale brown and cling in hit-or-miss fashion.

In contrast to the California washingtonia, the crown of this species occupies

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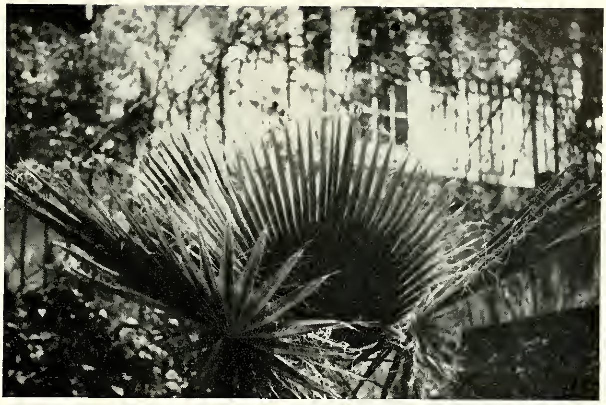
[3] This was after the brief cold weather of 1933. It is suggested that the trees were already in weakened condition or they would have gone through this unfavorable period. Dr. L. H. Bailey points out that this species is subject to budrot, on which see Gentes Herbarum, vol. IV, fasc. II, art. 3. *Washingtonia* December, 1936.

about 1/3 less space—the leaves are smaller and the petioles shorter. It is more or less "closed" with the leaves held in such fashion that the drooping segments, rather than the circular undivided portion, meets the eye when viewed from below. Fig. 45 illustrates the short, wing-margined hastula of a young leaf and the patch of tomentum on the under side of the blade. The latter character is of use in distinguishing this species.

The flowering stalks in all but very old trees are shorter than in the California washingtonia, averaging from 8 to 10 ft. in length. Fig. 9 (Part I) illustrates the spadices at the beginning of flowering. The 5 to 8 erect, whiplike main branches soon hang downwards. Since the lower ("handle") portion of the main axis is short (about 15 inches) and the branches only 4 to 5 ft. long, the whole effect is much more plumy and richly branched in this species. The flowers appear in May and June. The blackish berries are somewhat smaller and rounder than those of *W. filifera* (Fig. 42).

Livistona R. Brown.
Livistonas; Fanpalms.

Distinguishing features: Fan-shaped leaves large, partly folded along middle line, with slender drooping segments, clefts thickened and without filaments, hastula horseshoe-shaped and projecting from blade; boots rather thin, not splitting; fibrous leafsheaths conspicuous, reddish brown; flowering stalks (spadices) with overlapping tubular spathes, branches short; fruits olive-shaped, bluish green.

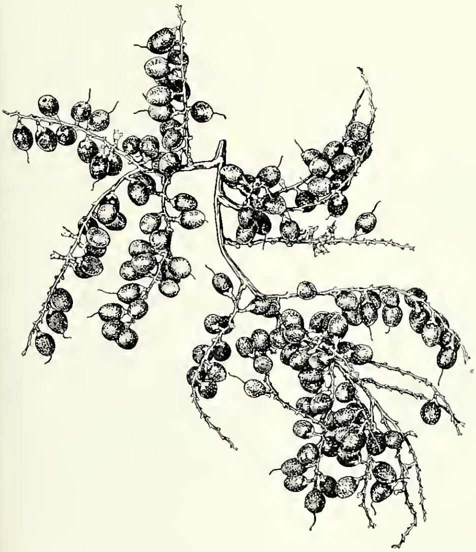


■ **Fig. 41. Young Mexican washingtonia, showing filaments between leaf segments and on margins and circular outline of undivided portion of leafblade. (W. ROBUSTA).**

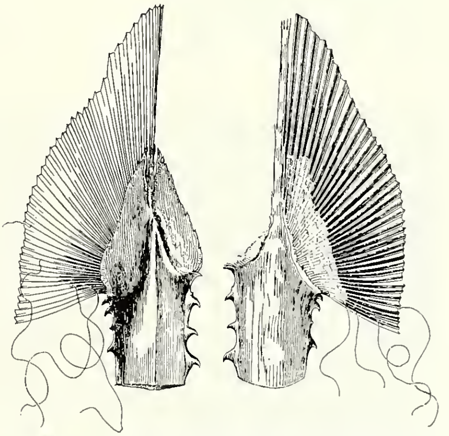
(These distinctions do not apply to the genus as a whole, but will aid in recognizing *L. chinensis,* apparently the only species in Louisiana).

The 24 species of *Livistona* are mainly tropical palms; they are native from India to China, Malaya, the Philippines, New Guinea, and Australia. Interestingly enough, the two best known species grow naturally in cooler regions: the Chinese livistona (*L. chinensis*) extends into the North Temperate Zone and the Australian livistona (*L. australis*) is the most southern palm of the Australian continent. The Australian species seems to be rare in the United States; both are cultivated in Europe. I have suspected several palms in Louisiana of being *L. australis* but I cannot be certain until they flower and fruit. A most attractive livistona, *L. mariae,* from the warmer parts of Australia, may be seen in southern Florida. The rather small, deeply divided, waxy leaves of the young palms are beautifully tinged with violet-red; the petiole is also red.

The single trunk is tall (up to 80 ft.) in most species of livistona; it is more or less ringed and topped by a usually dense leaf crown. The fruits, an inch or less in length, are round to oblong and differ greatly in color in the various species. Each contains a single seed and very little flesh.



■ **Fig. 42. Part of fruit cluster. (W. ROBUSTA).**



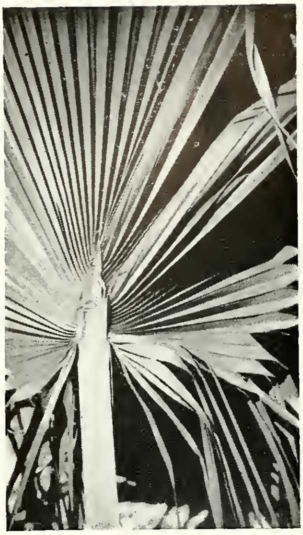
■ **Fig. 45. Young leaf of Mexican washingtonia (W. ROBUSTA). (left) Upper surface, showing hastula with wing-margin intact. (right) Lower surface showing tomentum patch surrounding prolongation of petiole into blade.**

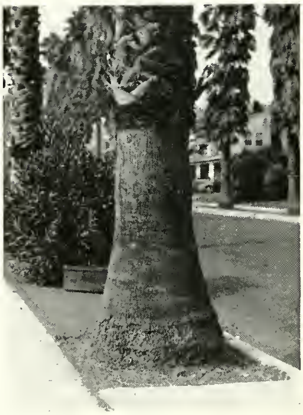
This is a generally useful genus. The outer wood of many species is very hard and takes a high polish. When split it serves for flooring; it is also used for rafters, canes, etc. and even for golf sticks in the Philippines. The leaves (petioles, blades, sheaths) are utilized by natives for brooms, baskets, ropes, and other necessary articles. The soft pithy interior of the trunk of some species furnishes sago.

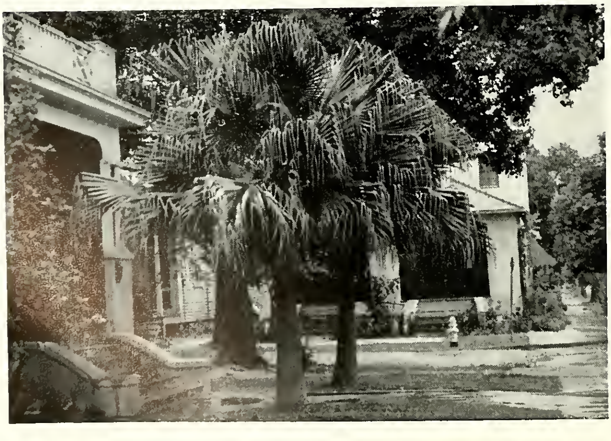
The genus name honors Patrick Murray, Baron of Livistone, founder of the Botanic Garden of Edinburgh, Scotland.

L. Chinensis R. Brown. ("*Latania borbonica*" of horticulture). *Chinese livistona;* Chinese fanpalm.

As the specific name indicates, this species is native to southern, perhaps also central, China. Commercially, it is the most important of the fan-leaved palms, being widely cultivated as a house plant, in greenhouses, and outdoors in warm-temperate as well as in tropical climates. It is about equal to the Mexican washingtonia in hardiness, slow-growing, and easy of culture. Young plants spring up quite spontaneously where the fruits have fallen. It does extremely well in the latitude of Lake Charles and New Orleans; I have seen few specimens north of Baton Rouge. The Chinese fanpalm is preeminently suitable for gardens (Fig. 46). It is sometimes planted as a street tree, but seldom in rows.







■ Fig. 47. (top). Young leaf showing projecting hastula and thickened clefts. (L. CHINENSIS).

■ Fig. 44. (center). Trunk detail (W. ROBUSTA).

■ Fig. 46. (bottom). Chinese livistona (L. CHINENSIS). Pine Street, New Orleans.

The Chinese fanpalm is frequently confused with washingtonias. However, the former has a much heavier crown, almost topheavy, in proportion to the trunk. The boots do not split to form a latticework but soon fall off. To my way of thinking, the bright brown leaf-sheaths loosely wrapped like mufflers about the petiolebases and soon hanging partly free are most distinctive. Then, too, the petioles are of various lengths on the same tree so that the leaves completely fill the crown. The petioles may be 9 ft. long in shade specimens.

The brown checkered trunk (30 ft. or more in height) is obscurely ringed. There are many tall (25 ft.) Chinese livistonas in Louisiana, especially in the "Garden District" of New Orleans. Mature palms measure 1½ ft. in thickness at the base of the trunk and only 10 inches at 5 ft. above the ground.

So much of the mature leafblade consists of a fringe of slender, hanging segments that it is difficult to realize that the leaf is so large—from 6 to 7 ft. broad and only a foot or so less in length. The leaves are bright glossy green; the outer half is divided into about 90 primary segments (2 ft. or more in length), which are partially divided again. The blade is folded somewhat along the firm middle line, then arches strongly on either side, and droops again. The thickening of the clefts between the segments is clearly shown in Fig. 47—there are no filaments—and the hastula may be seen to jut out at the junction of the petiole and blade. The petioles of the young leaves frequently bear a few sharp, slender spines or teeth on their margins but these soon disappear—they seem never to have been armed at all.

The Chinese livistona flowers when still quite low in stature. Inasmuch as the flowering (later, fruiting) stalks hang on for most of the year, they may be easily observed and also serve to identify this palm. Fig. 48 shows the close overlapping of the 7 to 9 brown spathes, each partly enclosing a short fruiting branch. The basal spathe is missing in the photograph. The spadices average 4 ft. in length. The brief flowering period is about 3 weeks in duration—usually in March—and the fruits are not fully ripe until October or November, although they are of nearly full size but still green and glossy several months earlier. The ripe fruits resemble heavy clusters of dull bluish green olives. They are somewhat less than an inch long and each contains a single seed of about the same shape as the fruit.

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CORRECTIONS FOR FIGURE CAPTIONS IN Part V (Winter 1938-1939).

Fig. 35. Should read: Crown of queen palm, with several club-shaped

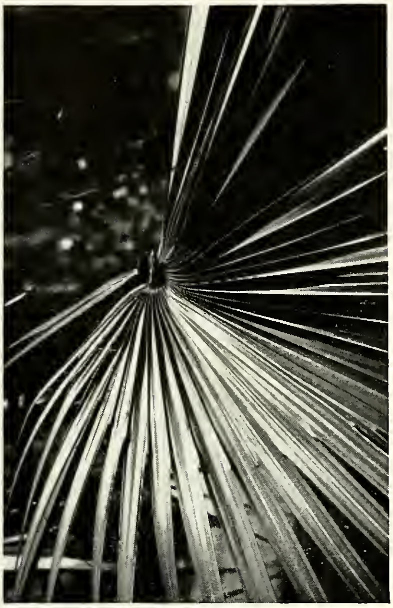

Fig. 43. (Right) Upper surface of leaf showing long-triangular hastula with wing-margin (W. FILIFERA).

spathes and some spadices in flower (A. ROMANZOFFIANUM).

Fig. 36. Should read: Totai palm (ACROCOMIA TOTAI). Photograph by the courtesy of Harold Mowry, Gainesville, Florida.

Fig. 37. Should be Fig. 38. (Caption is then all right) Fruiting spadix and spiny spathe (A. TOTAI).

Fig. 38. Should be Fig. 37. Should read: Trunk detail (A. TOTAI). Short Street, New Orleans. This tree has been removed.

MISLEADING FISH NAMES

Popular fish names are of interest. Such popular names may be utterly confusing; thus our "Green Trout," popularly so-called in Louisiana, possesses the 'book name' of Large-mouthed Black Bass; yet, it is neither a Trout nor a Bass, but is really a Sunfish. Another misleading name is that of our "Speckled Trout," which far from being a Trout is truly a Weakfish, related, therefore, to the Sea Drum, the Croaker and the Redfish.

Some of our popular sport fishes possess almost incredibly numerous popular names. Twenty-four different popular names exist for our Louisiana Sac-a-lait, and no less than forty-four different popular designations for our Louisiana Green Trout, the Large-mouthed Black Bass. The popular naming of fishes in Louisiana is even more than usually confused, because so many of our fishermen will fish one day in salt water and will, with complete assurance, transfer the name of a salt water fish to a fresh water fish and vice versa. Thus different names for the same fish—the same names for different fishes—there results a confusion that rivals, in difficulty of solution, a first-rate detective story.

◆

A Philadelphia fishing company is the oldest social club in the English-speaking world.

◆

The first American book on any field sport was a sermon on angling preached in 1739.

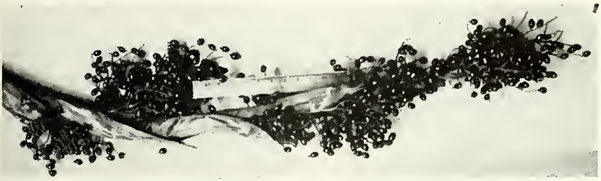

Fig. 48. Spadix of Chinese livistona with nearly ripe fruits. Basal spathe not shown. (L. CHINENSIS).

CONTROLLING CRAYFISH DAMAGE TO LAWNS

Crayfish, delectable on the table, may become objectionable on the lawn. The industriously constructed chimneys deface the velvet of many a terrace and putting green. The Department of Conservation continuously receives requests for the description of methods useful for crayfish control.

Many methods have been tried, the two following having been found to be most satisfactory:

First method: Dissolve one pound of chloride of lime in three gallons of water. Put some of this solution in a watering can with the sprinkler removed, leaving only the bare nozzle. Pour about a tablespoonful of this liquid down each crayfish burrow and close the opening of the burrow by pressing the earth together with the foot. The chloride of lime will kill the crayfish within a few hours.

Second method: Inject only two or three drops of carbon bisulphide into each crayfish burrow and close the opening by pressing together the earth at the burrow entrance. The vaporized carbon bisulphide will quickly kill the crayfish. It must be remembered, however, that carbon bisulphide vapor mixed with air is highly explosive and caution must be exercised to avoid any possibility of igniting it.

Use of either of the above methods will quickly solve the problem of getting rid of crayfish where their activities damage landscaping operations.

—James Nelson Gowanloch.

SOME BIG FISH

Catfish and buffalofish attain, among our fresh water species, the greatest size. The Channel Cat, sportiest of its family, may run 15 to 20 pounds; the Yellow Cat, or Goujon, 100 pounds; while the Blue Cat, though usually much less, has provided records of 150 pounds, 185 and 250 pounds. The Paddlefish, or Spoonbill Cat, so-called, although it is not a Catfish, has been known to reach 173 pounds. The real giants of Louisiana fishes, however, are sea species. The grotesque Headfish, or Ocean Sunfish, has been known to reach over 2,000 pounds. The equally bizarre Manta, or Sea Devil, has been reported as reaching the almost fabulous proportions of 2,000 pounds, 8,000 pounds and even an estimated 10,000 pounds.

◆

Forty years ago Fishing Club members were prosecuted in Pennsylvania for using the landing-net.

The Family of Marigny de Mandeville and The Fontainebleau Plantation 1700-1938[2]

A BRIEF CHRONOLOGY OF THE TCHEFUNCTE PARK AREA

By
Clarence L. Johnson*

Loan—Gaspar Cusachs Collection.

■ **Pierre Philippe De Marigny De Mandeville, 1751-1800.**

PART IV

1830. In *Le Courrier de la Louisiane* of January 21[3] the candidacy of Bernard Marigny for Governor was announced. A. B. Roman was, however, elected in July.

On July 12, Bernard Marigny "of the City of New Orleans" bought the property described below from "Martha Richardson wife of Joseph Letchworth".[4]

> . . . . . A certain tract or parcel of land, lying and being situate in this Parish [St. Tammany] and State, bounded on the South by Lake Pontchartrain, on the East by the Obner tract, now owned by the present purchaser, on the North by Chinchuba Creek, and on the West by the Labatut tract, now owned by Judge Lewis, containing six hundred and thirty one acres . . . . .
>
> This property was acquired . . . . . by inheritance from her former husband Zachariah Faircloth, who died leaving no heirs but his surviving wife the said Mrs. Richardson.

The sale price of the property (now Section 46, T.8S. R.11E. of the Greensburg District) was $3,200.

> . . . . . for which the purchaser has made two promissory notes of even date herewith payable to Joseph Letchworth; the first for two thousand dollars, payable on the first day of November next, at which time possession of the property is to be given. The other for Twelve Hundred Dollars, payable the first day of November, eighteen hundred and thirty-one . . . . .

Gustave Adolph Marigny, second child of Bernard Marigny's first marriage, died October 26th, at the age of 23,[5] leaving no issue.

On December 24th, Bernard Marigny bought the property described below from the heirs of Samuel Smith.[6]

> . . . . . A certain tract of land lying or being situate in this parish, [St. Tammany] on the margin of Lake Pontchartrain, bounded on the East by land formerly belonging to the Edwards' [Section 50] now owned by the present purchaser [bought on January 22nd, 1829] on the South by Mrs. Elizabeth Bartle [Mrs. Elizabeth Goodbee, widow by first marriage of Thomas Spell and by second marriage of Jacob Bartle], supposed to contain two hundred superficial acres.
>
> . . . .
>
> . . . . . This sale is made for and in consideration of the sum of sixteen hundred dollars all in hand paid . . . . .

This property (now Section 49 of T.8S, R.11E of the Greensburg District) later became part of Mandeville.

1831. Rosa de Marigny married Francisco Sentmanate y Sayas of Havana on June 20th.[7]

Marigny acquired additional property in St. Tammany Parish at this time:

> Be it known and remembered that on this fifth day of September . . . . . Jesse R. Jones, Judge of the Parish of St. Tammany, in pursuance of a Judgment of the Court of Probates for said parish, pronounced in the case of Hortense Delisle vs. Thomas Spell's heirs, after the legal advertisements and all the formalities required by law, I proceeded to the sale of a tract of land situate in this parish fronting on the Lake Pontchartrain and bounded

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* Senior Foreman Historian, National Park Service, formerly at Tchefuncte State Park. The basic research for this article was done by the Federal Writers' Project of Louisiana.

> on the other three sides by lands belonging to Mr. Bernard Marigny,[8] containing according to the certificate, three hundred and sixty acres, but according to the surveyor's return, only two hundred and twenty-one acres, and after the various offers and bids, Bernard Marigny of the City of New Orleans, being the highest bidder, said tract of land was adjudged to him for the price of One Thousand Six Hundred and Twenty dollars, which I hereby acknowledge to have received . . . . .[9]

This property (now Section 48 of T.8S, R. 11E, of the Greensburg District) later became part of the town of Mandeville.

Marigny was a perennial office seeker and few elections passed without his name being included in the list of candidates. He was the outstanding Creole in the state and while he often carried the predominantly Creole Parishes he received scant support from the up state Parishes. His ambition was to become governor of the state and he tried in 1824, 1828 and 1830 to secure the vote of the people for that office, but he was unsuccessful. Thus was fulfilled the prophecy contained in the following paragraph which appeared in *Le Courrier de la Louisiane*, for June 28th, 1824.[10]

> We read this morning in the *Louisiana Gazette*, a very mean paragraph, from a very mean writer, BERNARD DE MARIGNY, candidate *forever and ever* for the office of Governor, which he shall *never* get, notwithstanding all his journeys, and the handsome Spanish songs and *Boleros* with which he treated the voters of the upper Fourche; his promises to some, and his threats to others, in short those delicate means which excited a feeling of pity in the mind of everyone.

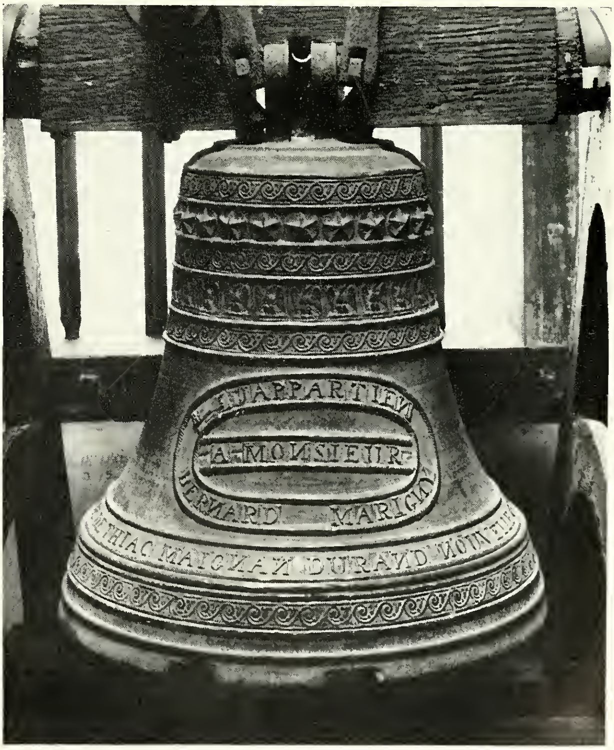
The following incidents show his persistence. On December 15th, 1831, Marigny was defeated at a special election for the seat of Mr. Freret, who had resigned from the House of Representatives.[11] Nine days later he was a candidate at another special election for the seat vacated by W. C. C. Claiborne in the House of Representatives by resignation[12] and was defeated by S. O. Dixon by one vote.[13] The election was immediately contested and on January 23rd, 1832 declared void by the House of Representatives.[14] In the new election Marigny won by a majority of 130 votes.[15]

Marigny served many years in the House of Representatives, part of a term in the Senate and held many local offices in New Orleans, being on the Board of Aldermen and the City Council repeatedly.

1832. In the regular July election, Marigny was elected one of the seven State Representatives from Orleans Parish.[16]

On March 15th, The Congress of The United States confirmed Marigny's claim to the two tracts of land bought on June 25th, 1829 from the Bonnabel heirs.[17]

> Laws of the United States Passed At The First Session of The Twenty-Second Congress.
>
> [PRIVATE, NO. 37]
>
> AN ACT for the relief of Bernard Marigny of the State of Louisiana.
>
> Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Bernard Marigny, as assignee of Antonio Bonnabel, be, and is hereby, confirmed in his claim to a tract of land of four thousand and twenty superficial arpents, situated in the State of Louisiana and Parish of St. Tammany, bounded on the southwest by Lake Pontchartrain, and on the northwest by lands formerly owned by the heirs of Lewis Davis; the tract confirmed by this section being the same which was surveyed for Antonio Bonnabel, by Carlos Trudeau, on the fifteenth January, one thousand seven hundred and ninety-nine and was granted to said Bonnabel on the twenty-fifth January, one thousand seven hundred and ninety-nine by Manuel Gayoso De Lemos, Governor General of the provinces of Louisiana and West Florida; and for which a claim was filed in the name of said Bonnabel, in the land office at St. Helena court house, under the act of Congress of Twenty-fifth April, one thousand eight hundred and twelve.
>
> Sec. 2. And be it further enacted, That Bernard Marigny be, and is hereby, confirmed in his claim to a tract of land of seven hundred and seventy-four superficial arpents, situated in the State of Louisiana and Parish of St. Tammany, bounded on the southwest by Lake Pontchartrain, on the northern side by Castin Bayou, and on the southern side by the lands confirmed in the first section of this act; the said tract of seven hundred and seventy-four arpents being the same which was granted on the twentieth January, one thousand seven hundred and seventy-seven, by Peter Chester, British Governor at Pensacola, to Lewis Davis, whose title to the same was afterwards, to wit, on the eleventh June, one thousand seven hundred and eighty-eight confirmed by decree of Estevan Miro, Spanish Governor of the provinces of Florida and Louisiana, and for which a claim was filed in the name of heirs of Lewis Davis, in the land office at St. Helena court house, under the act of Congress of the twenty-fifth April, one thousand eight hundred and twelve: Provided, That the said two tracts of land shall be considered as confirmed, in the same manner, and under the same regulations, restrictions, and provisions, as if the same had been recommended for confirma-



The Fontainebleau plantation bell.[1]

> tion in the reports of the commissioner for the district west of Pearl river and east of the island of New Orleans, which was confirmed by the act of Congress, approved on the third day of March, one thousand eight hundred and nineteen, entitled "An Act for adjusting the claims to land, and establishing land offices in the districts east of the island of New Orleans:" Provided, also, That the claim of Antonio Bonnabel, embraced in the said commissioner's reports, as of four hundred arpents, shall be considered as comprised in the forming part of the tract of four thousand and twenty arpents, confirmed in the first section of this act.
>
> Approved, March 15th, 1832

1833. Marigny introduced a bill in the state legislature to incorporate the Citizens' Bank of Louisiana.[18] The Act of incorporation was approved by Governor Roman on April 1st.[19] Marigny thus helped to create the institution which later took most of his fortune in mortgages.

1834. In this year Marigny decided to sell some of his property over the Lake and the following advertisements appeared in *The New Orleans Bee*.

> Valuable Property for Sale[20]
>
> *Quartier de Mandeville*
>
> Will be sold at public auction at Hewlett's Exchange, as soon as the plan shall be made, the wide space of ground divided in large lots, laying in front of Lake Pontchartrain, opposite the Railroad and at seven leagues distance from New Orleans: situated between Casting [sic] Bayou and Judge Lewis' plantation; it measures 5,000 arpents; previously to the sale a prospectus shall be published, which will give some particulars of the advantages of the place and the beauty of the trees which overspread it, and in order that the purchaser may convince himself of the facts mentioned in my prospectus, he shall be allowed to refuse the sale within one month after the day of sale, provided he will go and visit the lot adjudicated to him and will declare to my agent on the premises that he does not accept the adjudication; the purchasers shall be afforded the facility of repairing to Quartier Mandeville, on appointed days, at the house of Mr. Coquillon, who is a resident there.
>
> Dec. 7th B. Marigny
>
> TO THE PUBLIC[21]
>
> The steamboat Black Hawk, Captain Hoffman, will leave the railroad, Sunday next, at 9 o'clock A. M. for Mandeville, and will on the same day leave Mandeville, at 4 o'clock P. M. Persons desirous to visit the lots of ground offered for sale, are to repair to the railroad near the river at 8 o'clock A. M.—the departure will be at 8 1-2 A. M. Steamboat expenses will be paid by the subscriber.
>
> B. MARIGNY

A few days later *Le Courrier* carried the following item:[22]

> The sale of a small portion of the lands at Mandeville, situated over the lake, belonging to Mr. Marigny, and, which took place yesterday [February 24] at Hewlett's Exchange brought $55,000 [should be $40,975, see below].. The part of the lots sold does not constitute the fourth part of the whole. The sale continues today and will not probably be completed under two or three days.

The auction was conducted by Messrs. T. Mossy and Garidel and F. Dulillet and lasted three days (February 24th to 26th inclusive). Sales on the first day amounted to $40,975, on the second to $27,975 and on the third to $11,050, a total of $80,000 for the three days.[23] 426 lots were sold and the price ranged from $1,275 for Lot No. 3, Block 25 [on the Lake] to $40 per Lot No. 6, Block 18 [fourth Block from the Lake between Madison and Monroe Streets]. Considering that the entire property cost only $11,620 and that much of it was still unsold, Marigny made quite a handsome profit on his investment. Other lots were sold from time to time but as late as 1842 all were not sold as will be shown later.

The conditions attached to the sale of the lots were as follows:[24]

> Conditions: Payable in one, two and three years credit, in notes endorsed to the satisfaction of the seller with special mortgage until full payment. The acts of sale by Felix de Armas, at the costs of the purchasers.
>
> The purchasers will be placed in possession by the vendor, Mr. Marigny, has authorized us to say at the time of the sale that Captain Cherident is charged by him, and Mr. John Davis to buy a good steamboat of a superior travelling capacity, for the Mandeville trip and that the price of the trip across the Lake will not exceed one dollar.
>
> All the lots sold, conforming to the plan drawn by Louis Bringier, General Surveyor on January 14th, 1834, with the following observations, signed by Mr. Marigny.
>
> 1st. That the space situated between Lake Street, and the Lake will always remain free and for the common use; that no individual nor corporation shall raise any edifice whatsoever, nor change its destination, and that the banks of the Lake facing the said space will also remain forever free and for common usage.
>
> 2nd. That all streets have fifty feet of width, with the exception of the streets of Marigny and Jackson, which have a hundred, and of Lake Street which has sixty.
>
> 3rd. That the little Bayou Castaing which serves to drain, will not be stopped in its course as also the Shell Ravines in the width of at least 25 feet taken in the center.
>
> 4th. And that the wharf marked on the plan once completed conformably to the prospectus will be maintained by the owners of the lots of Mandeville.
>
> 5th. Mr. Marigny also obligates himself to have made a bridge across the little Bayou Castaing and one across the Shell Ravines, in the marked spots on the plan, these bridges once completed will be maintained by the owners of the lots of Mandeville.

[To be continued.]

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[1] The Fontainebleau Bell was given to The Louisiana State Museum by Mr. George W. Nott. The picture is published through the courtesy of Mr. James J. A. Fortier, Curator of the Museum, as are also the pictures of Antoine, Pierre and Bernard de Marigny de Mandeville. The following inscription appears on one side of the bell in raised letters, *J' APPARTIENS A MONSIEUR BERNARD MARIGNY*, On the other side is inscribed *SOUS LA GESSION* [sic. GESTION] *DE MONSIEUR H. TURPEAU*. Around the rim at the bottom is, "FONDUE A L'ATELIER DE THIAC MAIGNAN DURAND NOUVELLE ORLEANS LE 2 JUILLET 1825." Around the top of the bell, are twenty three raised stars, lower down are twenty three American eagles.

[2] In addition to the acknowledgments made in previous numbers the author wishes to thank the officials of The City Hall Archives for their many courtesies.

[3] *Le Courrier de la Louisiane*, January 21, 1830, Page 1, Column 1.

[4] *Notarial Archives*, New Orleans, Felix de Armas, Notary, September 6, 1834, Document 489. *Deposit of Documents* by B. Marigny. On August 6, 1834, no other heir having appeared to contest the sale it was ratified and confirmed before Jessie R. Jones, Notary Public.

[5] Data from Tomb in St. Louis Cemetery No. 2, See obituary in *Le Courrier de la Louisiane*, October 29, 1830, Page 3, Column 3, Cruzat, *Op. cit.*, 49 says that he was "killed in a duel", as does Tinker, *Op. cit.*, 307. *The Times Democrat*, November 15, 1885, Page 3, Column 3 says he "succumbed to a wound received in a duel with Mr. Lanus."

[6] *Notarial Archives*, New Orleans, Felix de Armas, Notary, March 4, 1834, Document 84, *Deposit of Documents* by Bernard Marigny.

[7] *Le Courrier de la Louisiane*, June 24, 1831, Page 3, Column 3.

[8] A search of the records has failed to reveal that Marigny bought Section 39 to the north of this tract and therefore it seems that he only owned land on two sides rather than three.

[9] *Notarial Archives*, New Orleans, Felix de Armas, Notary, March 4, 1834, *Deposit of Documents* by Bernard Marigny, Document 5.

[10] *Le Courrier de la Louisiane*, June 20, 1824, Page 1, Column 2.

[11] *Ibid.*, December 6, 1831, Page 3, Column 3, and December 15, 1831, Page 3, Column 1.

[12] *Ibid.*, December 24, 1831, Page 3, Column 1.

[13] *Ibid.*, January 5, 1832, Page 3, Column 1.

[14] *Ibid.*, January 23, 1832, Page 3, Column 1.

[15] *Ibid.*, February 2, 1832, Page 3, Column 1.

[16] *Ibid.*, July 6, 1832, Page 3, Column 2.

[17] *Ibid.*, April 2, 1832, Page 3, Column 1.

[18] *Le Courrier de la Louisiane*, January 15, 1833, Page 3, Column 1.

[19] *The New Orleans Bee*, April 8, 1833, Page 1, reproduces the entire Act of Incorporation.

[20] *The New Orleans Bee*, January 1, 1834, Page 1, Column 6.

[21] *The New Orleons Bee*, February 5, 1834, Page 2, Column 3.

[22] *Le Courrier de la Louisiane*, February 25, 1834, Page 3, Column 1.

[23] *Notarial Archives*, New Orleans, Felix de Armas, Notary, March 4, 1834, Document 84. *Deposit of Documents* by Bernard Mariguy, (2), "List of accounts of Properties sold at auction—belonging to Bernard Mariguy".

[24] *Ibid.*

* * *

RECORD FISH CATCHES

Some top records for Louisiana fishes may be of interest. Our Louisiana "Green Trout," the Large-mouthed Black Bass, has been scientifically recorded at 25 pounds, while sport periodicals have reported 34¼ pound catches. Our Louisiana so-called Speckled Trout has been taken at seven pounds, while the Striped Bass, or Rockfish, a sea fish concerning which there is little information in Louisiana, has been known to reach 125 pounds.

Favorite Louisiana Recipes

[Continued from Page 18.]

ing season at "Sweet Afton" are broiled partridges and squirrel stew with dumplings. We give both:

Broiled Partridges

Draw birds and let hang in cool air for a day or more. Pick dry. Wash birds and wipe dry. Cut down back and salt and pepper. Put butter in vessel that has an air-tight lid. Place the birds in the butter, breast down. Add a little water and let cook slowly until done. To brown, remove from vessel and run in the broiler or oven for a few minutes. If desired, use good sliced bacon in the beginning, adding the butter when the birds are done.

Squirrel Stew with Dumplings

Separate squirrel into pieces for serving and stew till quite tender. Then season with pepper, salt, butter and tender green onion, finely chopped. Thicken with flour that has been browned and blended. If necessary add more water and cook a few minutes. Add dumplings either dropped or rolled in thin strips. Do not crowd dumplings. Let cook for short time till dumplings are done and serve at once.

The late Governor O. K. Allen was an indefatigable sportsman, liking nothing better than a hunting or fishing trip with some of his "close friends" as we say here in Louisiana. Many times, after a strenuous day's fishing he would take it upon himself to clean all the fish caught and even cook them, too. Mrs. Allen was a cook WITH honor in her own country and she often prepared this courtbouillon for His Excellency:

Redfish Courtbouillon

3 lbs. sliced redfish
1 tablespoon fat
2 tablespoons flour
1 tablespoon chopped parsley
1 large sweet pepper, sliced
1 large onion, sliced
1 large can of tomatoes
2 pods garlic, minced
Boquet of thyme and bay leaf
1 pint water and 1 glass claret
Salt and pepper.

Clean and wash fish and make a roux. When brown put in onion, other seasoning, tomatoes and sweet peppers. Add water and claret. Salt and pepper fish and lay it in the sauce. Place finely chopped parsley and slices of lemon on the fish. Cover closely and cook for 25 minutes. Garnish dish with toast points and serve with boiled wild rice and creamed potatoes.

We cannot resist paying a tribute to the fine cookery of old Aunt Mymie, who for many years presided over the kitchen of the late Dr. Russell E. Stone. When company came to dine she always "put de little pot in de big pot" Her favorite dish, which she said she cooked "jes fur myself", was baked " 'possum with sweet 'taters."

Sometimes a leg would be mysteriously missing from the nicely browned animal and Aunt Mymie would mutter, "Mighty funny things happen in dis house. My white folks say dey wouldn't tech possum meat, but I'd like to know jus' where dat hine leg went to!" This is the way she baked it:

Baked O'possum

Skin, clean and wash in cold water. Make a good, highly seasoned dressing, with eggs. Stuff the opossum and sew up the opening. Dredge with flour, place in a roasting pan, and cook till done, basting often. Peel yam sweet potatoes and place around the meat. When done, drain off the fat, leaving only enough in the pan to make a flour gravy. Serve hot with turnip greens and baked corn pone.

In closing, we give all lovers of outdoor life a cordial invitation to come to Louisiana, where the "makings" of these dishes and many more, are easy to find; where streams, marshes and woodlands, teeming with wildlife await you; and where your fellow sportsmen of Louisiana will all be wishing you "GOOD HUNTING!"

■ **Members of the Lake Charles Tarpon Club and display of their catch.**

Louisiana possesses a greater variety of fishing waters and a more abundant supply of fish than any state in the Union; but it is only in recent years that this attraction has been publicized.

Tarpon, the Silver King, has served to attract sportsmen to other states, although it is now conceded that this great game fish strikes faster in Louisiana waters than anywhere else.

For some years the Grande Isle Tarpon Rodeo has been held off Fort Livingston Pass, in the latter part of August or early September.

The rodeo of the New Orleans Tarpon Club, confined to fish caught within the city limits of New Orleans, begins this month and runs through September.

In addition there will be the second renewal of the Seymour Weiss Rodeo, instituted by Col. Weiss last year, with a $100 prize for the largest tarpon caught within the city limits of New Orleans on August 27th. The prize will be awarded through the New Orleans Tarpon Club, as a feature of their all-summer city limits rodeo, and the presentation will be made at the time the other tarpon club awards are made, early in October.

Announcement has been made of a new tarpon rodeo, to be staged for the first time this year, at Southwest Pass, which has proven to be the finest tarpon fishing locality in the world.

William G. Rankin, Louisiana commissioner of conservation, is general chairman of this rodeo, which is sponsored by the Department of Conservation and the New Orleans Item-Tribune. Governor Leche, who is honorary chairman, is expected to be one of the contestants. A. Miles Pratt, collector of revenue at New Orleans, will serve as presiding judge. There will be many handsome prizes awarded.

* * *

QUEER FISH

Among the interesting fossils frequently exhumed at George Washington Birthplace National Monument, Virginia, are remains of fish that swam the Atlantic far back in the Tertiary Period.

A recent specimen has been identified by geologists of the National Park Service as the dental plate of a giant ray. The plate includes five nearly complete teeth and a small portion of a sixth. The scientist believes that this particular fossil is the remains of one of the giant "Eagle Rays" that lived along the Atlantic Coast some millions of years ago, most of which are placed in the genus Myliobatis.

Bullock Oriole and Sand Pike Added to Louisiana Bird and Fish Lists

By
James Nelson Gowanloch

A western bird and a northern fish have been added to the faunal lists of the State of Louisiana. The Bullock Oriole is the bird. A western species of unusual beauty, it was found by Miss Ava R. Tabor of Thibodaux, Louisiana, at Thibodaux. The Sand Pike or Sauger is the fish. Member of an important and highly prized group of game and commercial species, it was taken at Monroe by Bobby Downing, son of Ben R. Downing, Vice-President of the Ouachita National Bank, Monroe, Louisiana. Both fish and bird now assume their official status as inhabitants of Louisiana.

Miss Ava R. Tabor, for some years a volunteer migratory bird observer for the U. S. Bureau of Biological Survey, noted the occurrence in Thibodaux of Orchard Orioles during the wintertime, a season when these birds are supposed to be far south of Louisiana, since their normal winter range is from southern Mexico to northern Colombia. She observed an Orchard Oriole flock of two females, two males and one changing male on December 24, 1937, and on November 28, 1938, she noted the occurrence, also at Thibodaux, of two pairs of Orchard Orioles which remained there all winter, until joined in the latter part of February by other Orchard Orioles from farther south. Her interest aroused by the unusual winter presence of the Orchard Orioles, Miss Tabor kept close watch for these birds and was rewarded during February last by discovering the presence of a strange female Oriole which she did not believe to be an ordinary Orchard Oriole. This bird, haunting her aunt's garden, was found dead on February 5, 1939. This individual is a female Bullock Oriole, the first of its species ever to be recorded for Louisiana. Identification was made by Professor George G. Williams of Rice Institute and confirmed by Dr. Harry Church Oberholser of Washington, D. C.

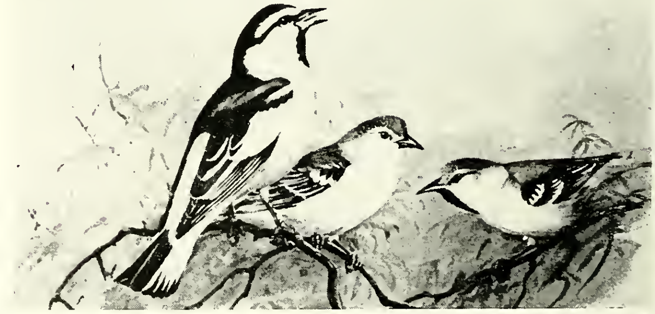
The Bullock Oriole breeds in the lower part of the Transition Zone from southern British Columbia, southern Alberta and southern Saskatchewan to southern Texas, northern Lower California, Sonora, and northern Durango, and from the Pacific to eastern South Dakota, central Nebraska, and western Kansas. It winters in Mexico south to Colima, Michoacan, Guerrero, and Puebla, casually to eastern Kansas in migration. Its occurrence in Louisiana is the more extraordinary since not only is this the bird's first appearance in the State, but it made its appearance at a most unseasonable time when it should have been occupying a winter range far south in Old Mexico.

The Bullock Oriole was first described in 1827 by Swainson from the "tableland of Mexico." Eight and a half inches in length, it has a typically long and pointed Oriole bill and a chiefly black and orange plumage. The Baltimore Oriole measures eight inches in length, the Orchard seven inches. The Bullock Oriole is technically designated as *Icterus bullocki*. The male of this species differs chiefly from the males of the two other Louisiana Orioles, the Baltimore and the Orchard, in that whereas these two latter birds have head, neck and shoulders uniformly black, the Bullock Oriole has the black confined to the crown, the hind neck, the back, the shoulders, the lores, the front portion of the cheek and a broad stripe down the middle of the throat. The rest of the head and neck, including a broad stripe over the eye and sometimes the entire forehead is black.

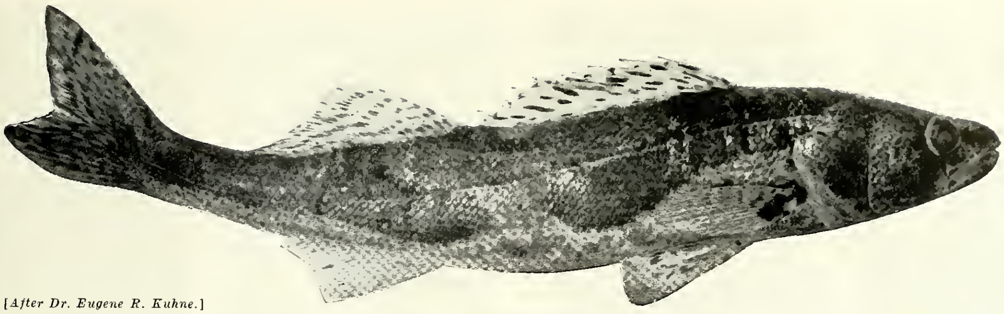
Orioles are really incorrectly named, since the true Orioles are birds of the Old World, whereas the North American Orioles (so named because they, like the Old World Orioles, are conspicuously orange and black) are members of a bird family, the Icteridae, confined exclusively to the Western Hemisphere. The Icteridae include many other familiar American birds, such as the various Blackbirds and Grackles, the Meadowlark, the peculiar Cowbirds and the Bobolink or Ricebird.

As a result of correspondence by the present writer this specimen of the Bullock Oriole, the newest addition to our rich Louisiana avifauna, has been presented to the Department of Conservation by those concerned in its original discovery and will thus take its place in the fine natural history collections on permanent exhibition in the departmental museum at New Orleans.

Mr. Ben. R. Downing, Monroe, Louisiana, submitted to Sheriff J. B. Dauenhauer, Jr., Director of the Division of Fisheries of the Louisiana Department of Conservation, a fish taken in the Ouachita River by his son, Bobby. Attracting attention because of its unusual appearance, this fish was unknown to the Monroe fishermen and sporting goods dealers. Turned over for identification to the Chief Biologist of the Department of Conservation, the specimen proved to



■ **The Bullock Oriole, handsome new member of the Louisiana State bird list, is a vivacious western species. Above are shown, left to right, the adult male, the adult female, and the young male. Young Orioles exhibit interesting plumage changes before attaining their adult colors.**



[*After Dr. Eugene R. Kuhne.*]

■ **The Sauger or Sand Pike, a trim, stream-lined game fish, is added to the Louisiana list. It is a member of the Pike Perch family to which also belong the Wall-eyed Pike and the Yellow Perch.**

merit the interest that it aroused since it is game species of which no published authenticated Louisiana record appears to be available.

The Sauger or Sand Pike, technically known as *Cynoperca canadensis*, was described from Canada in the year 1836 by C. H. Smith. It is a member of the Perch family, the Percidae, comprising the Perches and the Darters. The term "Perch" is so widely, vaguely and often wrongly used that it has almost ceased to have any clear meaning. Here in Louisiana, for example, fishermen habitually refer to various members of the Sunfish family as Perch.

The true Perches are trim, quick, game fishes of finest food value. Three species are of high importance, the Sauger or Sand Pike, the Wall-eyed Pike, *Stizostedion vitreum*, and the Yellow Perch, *Perca flavescens*. The Sauger and the Wall-eyed Pike are together known more specifically as the American Pike Perches.

The Perches have large mouths. Certain of their sharp teeth are developed, in the case of the Wall-eye and the Sauger, into pronounced canine teeth. The Sauger with its various subspecies has a wide recorded range over eastern United States and Canada, occurring from the Great Lakes and St. Lawrence region westward to Montana and southward to Tennessee and Arkansas. Although in the North the Walleye is regarded as somewhat superior in food qualities to the Sauger, the reverse opinion is true in the southern part of its range. The Sauger's white, firm and flaky flesh matches in flavor the best North American fresh water fishes. The Wall-eyed Pike reaches three feet and a weight of twenty-five pounds, as against eighteen inches and rarely over three pounds for the Sauger.

The Sauger is a fish hunter, inhabiting by preference somewhat shallower water than does the Walleye. Early in its life it begins its predatory existence by feeding on other fish species. Through some of its southern range the Sauger is most incorrectly known as "the salmon." Salmon, quite unlike the Sauger in appearance, structure and habits, belong to an altogether different fish family, the Salmonidae. The Yellow Perch, a fine and valuable game and food fish, is also widely ranging throughout the waters of eastern United States, chiefly northward and eastward, and is common in the tributaries of the upper Mississippi. It is not known from the lower Mississippi valley.

The Sauger, an excellent game fish, has shown throughout its range, like the Yellow Perch and the Walleye, a disastrous decline in numbers, dropping from a total production in the Mississippi River and tributaries for Wall-eyed Pike and Sauger of 910,057 pounds for 1894 to only 29,395 pounds in 1922. Changed stream conditions due to village, town and city development and industrialization are regarded as being chiefly responsible for this decrease.

The Sauger closely resembles the Walleye in external appearance. It may be best distinguished from that species by the fact that although both have the anterior dorsal fin marked with three horizontal rows of roughly oval black spots (with an indication of a partial fourth row), the Walleye has in addition a large black patch in the posterior region of this fin. The Sauger on the other hand has a black spot at the base of the pectoral fin, a marking absent in the Wall-eyed Pike. Internally the Sauger can be distinguished from the Walleye by the fact that it has four to eight finger-like pyloric caeca attached to its stomach whereas the Walleye has only three. The form of Sauger occurring in the southwestern part of its range has been described as a distinct subspecies to which the name *Cynoperca canadensis grisea* has been given.

The Sauger in life is a handsome fish, olive-gray in color with dark-mottled, brassy, orange sides, the irregular patch-like markings being more distinct in younger specimens. The fin and body markings are particularly well shown in the accompanying illustration taken from Dr. Eugene R. Kuhne's recent bulletin.

Perches are related on the one hand to the Sunfishes (the Centrarchidae), a family that includes the Large-mouthed Black Bass ("Green Trout"), the Kentucky Bass and the various other Sunfishes known as Bream, Perch, etc. On the other hand they are related to the Sea Basses which include important game and food species.

The specimen, which was caught by Bobby Downing out of a school of similar fishes, has been added to the exhibition collections of the Department of Conservation museum.

* * *

EARTH TREMORS NOT DUE TO WAVES ON FAMOUS BEACH AT WAIKIKI

Volcanic activity can frequently be forecast by science with considerable accuracy. Among the helpful criteria are earth vibrations which vary from shocks so slight that they can be recorded only on very delicate instruments to those of great intensity. Microseisms is the scientific designation of the minute disturbances. Their frequency and points of origin are sometimes significant in interpreting the activity of a volcanic region.

For years the Hawaii Volcano Laboratory in Hawaii National Park has been conducting studies of microseisms, the park naturalist aiding in the work. One hypothesis advanced was that some of the slight tremors might be due to the pounding of the waves on the shores of the islands rather than to the adjustment of the earth to internal strain. Tests made by the park naturalist, however, do not support this theory. During summer the waves at Waikiki are largest, yet this was the season when microseisms were weakest. Conversely, during the winter months, when the minute earth tremors attain their strongest effect, the force of the waves on the beach is at a minimum. Although the study eliminates the waves as causative factors, it does not explain the reason for the varying intensity of the microseisms.

■ **Coral Reef.**

■ **Autumn Leaves.**

■ **Poinsetta.**

■ **Indian**

New Louisiana Industry Is Boon To Anglers

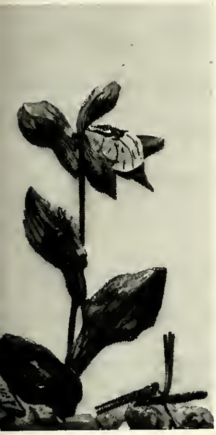
Gar scales found suitable for high quality art frames, new modernistic jewelry, and advertising novelties

Commissioner Wm. G. Rankin, who has closely followed the garfish control experiments instigated by him under the Department of Conservation, is highly pleased with an announcement by Percy Viosca, Jr., consulting biologist of the department, that he has developed a use for garfish scales. With such utilization, effective control of these giant destroyers which infest the bayous and lakes of Louisiana is a step nearer realization. According to Mr. Viosca, not only are the outer parts of considerable intrinsic value but maybe the whole fish, which is edible and can be made into food for man and beast.

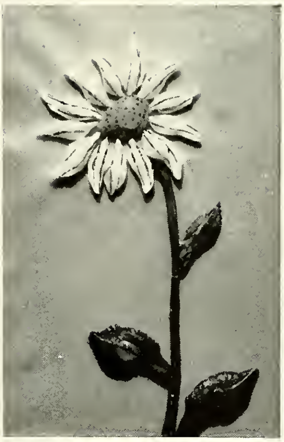
Of outstanding interest in connection with the use of the scales are a series of novelty designs executed by Mr. and Mrs. Viosca, the originals of which are on exhibit at the Conservation Department Museum at 239 Royal Street. The initial or inspiration design of the series represents a coral reef. In it are varicolored coral reef fishes on a water-green background. Second of the series, titled "Autumn Eve," shows falling leaves in autumn colors. Several of the group represent flowers, including native wild flowers. Among these are the poinsetta, tulip, Indian pipe, lady slipper orchid, daisy, black-eyed Susan, and sunflower. Among the novelties are an out-door camp fire with a wild turkey roasting on a spit, also a cave showing stalactites and stalagmites. Landscapes are not neglected. Striking among these is a rock and flower covered hillside, a Dutch garden, a beach scene, and a sailboat rounding the point of a palm covered island. This last named is considered by some the masterpiece of the series. A remarkable quality of these new designs is that they stand out in bold relief and appear to be the actual object or scene in three dimensions, not just a flat picture. Furthermore, they are non-perishable and cannot be destroyed by insect pests. The backgrounds vary, art silks giving beautiful effects. The new art is not only capable of depicting natural objects and scenes, but permits of unlimited development in the field of design, even in the futuristic and surrealist fields.

■ **Some Processes of treatment of Gan-Ivory.**

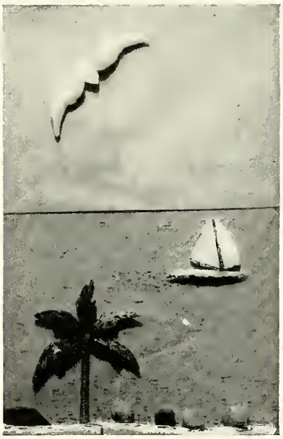
The inspiration for the new industry dates back over a year to a conversation Mr. Viosca had with Mr. H. A. "Uncle" Barbier who lives and fishes on Pass Manchac. Mr. Barbier was interested in the control of alligator gars not only because they prey on the fish he catches, but they break his lines and interfere with his fishing. He asked the Department of Conservation to make an investigation of those infested waters. During the course of a conversation, Mr. Barbier said he believed that gars could be kept under control if someone could find a use for the scales. Mr. Viosca took a handfull and examined them closely noting that several of them were shaped like the little fishes which frequent



■ **Lady's Slipper Orchid.**



■ **Daisy.**



■ **Seascape.**

■ **Rocky Hillside**

coral reefs. He had noticed it before but this time a thought struck him.

"Yes, I can find a use for them."

Within a few days he had completed his first design, titled "Coral Reef." For several months following, during the little spare time they could find at night, sometimes late into the early morning, Mr. and Mrs. Viosca studied the scales carefully, noting resemblances to leaves, flower petals, and other objects. Then came winter and no gars or scales could be had. With the advent of spring the Vioscas secured a sizeable quantity of scales and continued their experiments on a larger scale.

Many problems in physics and chemistry had to be solved and here is where a liberal education in the arts and sciences came in handy. Treatments of various kinds for coloring and polishing them and for producing products for different purposes had to be solved. Already the scales have been assorted and graded into more than fifty different classifications, each of which represents one or more different objects or part of a composition.

Basic patents and copyrights have been applied for and under the registered name "Gan-ivory," samples were submitted to jewelry and novelty manufacturers in the north and east. Attractive novelties and jewelry are being fashioned from certain types of these scales. The following are excerpts from correspondence already received by Mr. Viosca:

"The framed garfish scales strike my fancy." "I have come upon a new plan concerning them and would appreciate it very much if you could send me some as quickly as possible." I am eager to work on this immediately."

"I have just contacted a man who wishes to purchase the scales in ton lots. He is a dealer here and he manufactures ornaments sold in five and ten cent chain stores."

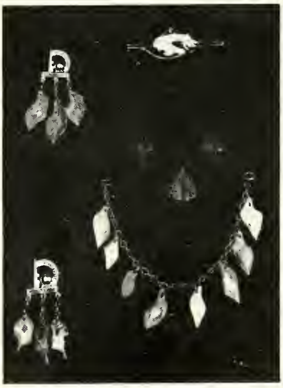
"I received the package from you a few days ago, and certainly these are most interesting." "These scales would seem to lend themselves particularly well to spring and summer jewelry."

"He was very much interested in these and feels quite sure that he can put you in touch with some manufacturer with whom a proposition of mutual interest would develop."

"Our thought is to use this in inexpensive articles, so therefore the more attractive the price is, the better our possibilities of using it."

"It is possible that we might be able to use this material as a novelty and would attempt to tie it up with the several uses that it might have in connection with the Indians."

The Viosca's and their associates have also designed other interesting and attractive souvenirs and novelties made strictly from Louisiana Shells and products. One of their specialties, the "Rainbow Shell" is being introduced for the first time on Rainbow Avenue at the New York World's Fair.



■ **Jewelry Made From Gar Scales.**

* * *

THEODORE ROOSEVELT AMONG FIRST TO URGE CONSERVATION OF SEASHORE AS WELL AS WOODLAND

Even forward-looking conservationists are only just beginning to realize the necessity, urged by the National Park Service of the United States Department of the Interior, of preserving such of our few remaining natural seashores as have escaped commercialization. Yet Theodore Roosevelt must have comprehended this need when he wrote: ". . . Every lover of nature, every man who appreciates the majesty and beauty of the wilderness and of wildlife, should strike hands with the far-sighted men who wish to preserve our material resources, in the effort to keep our forests and our game beasts, game birds, and game fish—indeed, all living creatures of prairie, and woodland and seashore—from wanton destruction. Above all, we should realize that the effort toward this end is essentially a democratic movement.

"Surely our people do not understand yet the rich heritage that is theirs. There can be nothing in the world more beautiful than the Yosemite, the groves of giant sequoias and redwoods, the Canyon of the Colorado, the Canyon of the Yellowstone, the Three Tetons; and our people should see to it that they are preserved for their children's children forever, with their majestic beauty all unmarred."

BIENVILLE RETURNS

By
Will Branan

The Doughty French Soldier Marvels at the Development of His Louisiana

In 1939, over two hundred years after his memorable visit to Louisiana, Jean Baptiste le Moyne de Bienville, founder of the City of New Orleans, returns to these shores.

When last he stood on the spot of dry land, ninety miles from the mouth of the Mississippi, Father of Waters, Bienville scanned the distant horizon, the far-flung panorama of virgin forest in a vast expanse of turbulent waters. Here he could picture a great trading post, perhaps a storehouse of furs, even bars of gold from the Spanish mines of Mexico, which should be borne in tribute to his master, Louis the Fourteenth, but he could hardly have envisaged, in his imaginative flights of fancy, the strange happenings of the next two centuries; he would have been astounded, indeed, at the Louisiana of to-day.

When Bienville planted the flag of France on the site of Nouvelle Orleans he had a rather vague conception of the extent of the great empire which LaSalle had claimed for his sovereign, although he was born in Montreal and had journeyed to the French trading post, Natchitoches, some years earlier. Even eighty years later, when Napoleon Bonaparte was hard pressed for cash, he set a low value on the resources and potentialities of the Province of Louisiana, his ambition being primarily to strengthen the young rival of his ancient enemy, England. Approximately fifteen million dollars were paid by the United States for a territory now valued at hundreds of billions of dollars.

As might have been expected, the ubiquitous reporter was on hand when Bienville landed at New Orleans from that far-off celestial planet where he had resided since his departure from this earth.

This Inquiring Reporter had been assigned by his editor to accompany the Sieur de Bienville on his grand tour of Louisiana, but the gallant voyageur was to learn more from the reporter than the reporter learned from him; for the changes that had taken place in the preceding 221 years were truly astounding and such that the amazement of the Siegneur knew no bounds, so that he plied the reporter with one question after the other, never seeming to tire of the revelations and re-discovery of a land whose wonders he had not dreamed of on his first visit.

SEES CHANGES HERE

Standing at the foot of Canal Street, the great French explorer surveyed the sky-line of New Orleans, the towering sky-scrapers flanked on either side by structures of smaller stature, the River harbor and ships anchored at the wharves.

"Mervellieux!" exclaimed the Siegneur, unable to restrain his enthusiasm. "These great ships, what magnificent creatures! My little vessels were but pygmies, mere dwarfs! But, M. Journalist, what has become of their wings?"

"You mean their sails?" responded the Inquiring Reporter. "Yes, I suppose it would surprise you that these wonderful vessels are able to move under their own power, with no assistance whatsoever from the winds. Now they come over the ocean from la belle France in four or five days, one-tenth of the time required in your day, M'sieur. But it will surprise you even more to learn the source of the power that moves this giant boat."

"It will be a pleasure," Bienville replied.

"In the old days, many years ago," said the Inquiring Reporter, "this power was generated by steam from boilers, their furnaces fed by coal. But nowadays oil is used for fuel and we have a remarkable engine called the Diesel to convert this oil into power."

"We would have called it black magic," said the Siegneur. "It must be a wonderful product that performs such a miracle."

"It is a black liquid that gushes from the ground, sometimes from only a few hundred feet beneath the surface, sometimes from depths of over two miles, from the very bowels of Mother Earth.

"When I say that oil gushes from the earth it may convey the impression that it is a voluntary or spontaneous eruption, but such is not the case. The recovery of this liquid 'black gold,' which is refined into a golden yellow fluid called gasoline, is an intricate process and represents a triumph of the scientific mind of man, his inventive genius and persistent engineering skill."

IT WAS ALWAYS GOLD

"Your story fascinates me," said the great Siegneur. "It suggests our own dreams of gold. In my time we were always looking for gold, which was the symbol of power employed by our masters. Columbus was seeking a more direct route to the gold of the East Indies when he discovered America. Cortez, Pizarro, all the great captains of Spain, measured the value of their conquests in the amount of gold that they could send back to their sovereigns. It is strange that we knew nothing of this liquid 'black gold' and its mysterious power."

"Do you see that vehicle coming down the street?" asked the Inquiring Reporter.

"Yes, I have been watching those devil-wagons, scurrying about," Bienville replied. "I presume they move without horses because of the same mysterious force that propells the giant ship."

"There are twenty-five or thirty million of those vehicles on the streets and roads of America to-day, all powered by oil or petrol, as the English call it. Since the first commercial production of oil we have consumed more than 21,000,000,000 barrels in the United States alone."

"That is a lot of oil—and it seems to me that the underground containers would be exhausted," was the Siegneur's sage comment.

The phantasy of a Bienville who returns to this "mortal coil" after a lapse of 200 years is perhaps no stranger than some of the scientific achievements of our own day. The deep-seated oil structures of Louisiana are a challenge to the scientific mind, to perfect the techniques of exploration and drilling; the achievements of to-day will be the inspiration for those of to-morrow.

THE PROVEN RESERVES

"There you have hit upon a question that is widely debated," said the Inquiring Reporter. "It is now estimated that our proven reserves will total another seventeen billion barrels of oil. During the past five or six years our consumption of gasoline has more than doubled in volume, but at the same time we continue to discover new oil fields and there appears to be little if any diminution of our oil stocks."

"And that great bird flying in the sky?" asked Bienville, "is it possible that it, too, has a gasoline engine for its heart?"

"Yes, that is an air-plane, a comparatively new development of our mechanical age," said the Inquiring Reporter. "The air-plane has not only become an important factor in passenger transportation—it is now recognized as a death-dealing instrument of war."

"Tell me more about the marvellous product that powers these mechanical birds."

"That is a big assignment," said the Inquiring Reporter. "But it will interest you to know that the advance of the oil industry in South Louisiana is peculiarly a scientific development. Owing to the deep-seated oil formations and cost of drilling, it has been necessary to improve the instruments of reflection and refraction that are employed to locate the oil structures. These instruments do not now detect the presence of oil itself, but the characteristic geologic formations where it is most likely to be found."

"It is all very interesting," said the Siegneur. "Fortunately my own explorations were confined to the surface of the ground. Even so we had to contend with many obstacles that are unknown to-day. We had to cut our way through primitive forests and swamps; many of our followers were lost to the savage red-skin, to wild animals and the more fatal small-pox and yellow fever."

THE CONQUEST OF SCIENCE

"I can well appreciate that," said the Inquiring Reporter. "And we are greatly indebted to the early explorers and the pioneers who came after them, for the conquest of the vast wilderness that was Louisiana. But science is now engaged in another conquest that is quite as thrilling, if less dangerous, that carries us deeper and deeper beneath the surface of the earth, to recover the liquid 'black gold' that was cached there by Nature so many years ago."

"I have been wondering," said Bienville, "what was the origin of this mysterious product? what was its composition in the beginning? was it formed from plant life? from trees and shrubbery? or is it perhaps the remains of some prehistoric animal?"

"Well, M'sieur, I must admit that while more than 200 years have elapsed since your last visit the origin of oil is still something of a mystery, although many theories have been advanced. However, if you will come with me to the Department of Conservation we may be able to obtain some more definite information as to the origin of oil in Louisiana."

Arm in arm the Sieur LeMoyne de Bienville and the Inquiring Reporter strolled down Canal Street to Royal. The Siegneur was still garbed in the raiment which he wore on his departure from this earth, but such costumes are familiar to Orleanians, who are likely to see almost anything around Mardi Gras. The Inquiring Reporter was in his working clothes, which he also wears on Sundays and holidays, so that the two attracted no special attention as they strolled down the street.

Bienville's prestige made him persona grata at the offices of the Conservation

Department, although the familiar face of the Inquiring Reporter was less welcome. Finally the visitors were seated beside the desk of one of the savants of the Research Division.

THE SAVANT SPEAKS

"For you, M'sieur, I would tell all," said the savant. "Millions, possibly billions of years ago, a huge mass of vapor revolving around a central nucleus hurtled through space at an almost unbelievable speed, tracing out a fiery path along the orbit in which it was held by the gravitational pull of its supposed parent, the sun. The whirling mass began to condense and cool, possibly two and a half billion years ago. The far-flung vapors gradually closed in around the nucleus, cooling from vapor to liquid, and to solid,—and thus was formed this earth of ours, with its atmospheric envelope."

"Bravo!" exclaimed Bienville. "I might even say bravissimo! Who would have thought this old earth had gone through so much? Even in the time of Columbus they suspected that the earth was round, but they had no idea it was once such a hot spot."

Continued the savant: "The hard crust of the earth was never, and still never is at rest, responding in waves to gradual adjustments made necessary by unequal cooling of interior fluid masses, subsiding now to be covered by new seas, rising again to be carved and cut down by the forces of erosion,—occasionally breaking under the strain, and pushing up into huge mountain ranges, or cracking in spots to emit great flows of molten rock. In their turn the mountains yield to Nature's erosive forces and are gradually washed down again in rivers to the sea.

NEW COAST LINES

"One portion of the earth's surface we call Louisiana, a territory which has been submerged time and again beneath the ancient seas to be built anew of sea-borne sediments with their wealth of microscopic animals. For countless centuries since its last major submergence Louisiana has received from its neighbor states to the north, east, and west tremendous volumes of river-borne silts dropped to form new coast lines as the moving river merged with the quiet waters of the Gulf."

"I would never have suspected it," said Bienville. "Of course I could see that the Father of Waters was busy doing something, but I never knew exactly what—and there was no Department of Conservation savant in my company to advise me."

Continued the savant: "Buried for all time in Louisiana's subterranean treasure chests are the remains of countless millions of the remains of microscopic living things, trapped in the slime and ooze of the sea bottoms during submergence, locked in the great retorts of the earth in which Nature slowly, through aeons of unrecorded time, distills from them the 'black gold' which forms the objective of the drillers' hopes.

"Against that great tapestry whose warp and woof depict the history of nature's alchemy, the origin, the growth, the death and decay of animalculae, the action of nature's heat and pressure in the presence of almost inconceivable time, the formation, migration and entrapment of petroleum oil and gas,—against that great tapestry, the whole history of man and his vaunted accomplishments, the whole sum of all his wars and worries seems but the finest of single strands. Yet, man, with the aid of his God-given intelligence and reason has here and there found and opened many of the treasure chests with which Mother Nature endowed our state of Louisiana, treasure chests filled with black gold,—a product of the Alchemy of Time."

"This chap seems to know a good deal about the beginnings of Louisiana," said the great Siegneur, sotto voce, to the Inquiring Reporter. "It's a pity I didn't have him on my staff when I first visited these shores. His great store of knowledge would have provided much entertainment for the members of my company."

SKEPTICAL JOURNALIST

"Well, one dog's bite is as good as another's," replied the Inquiring Reporter. "From my journalistic experience I should say that his gleanings from the knowledge of other savants has had the benefit of his own ripe imagination."

"Be that as it may, what he tells us will serve until disproven by some other savant," said Bienville, whose philosophic attitude makes him a most agreeable companion for the Inquiring Reporter, who now suggests that they consult the bright young men of the Geological Division.

"These geologists have an advantage over the other savants in that they are able to confirm or disprove their theories by direct contact with their sources of information. Then, too, their investigations are comparatively up-to-date—only a few million years have elapsed since the geological periods which they discuss—and it is less difficult for the finite mind to comprehend their story."

"In my own time they would probably have burned all of these fellows as witches", said Bienville. "But doubtless they serve some purpose in the scheme of things—and I would be very happy to hear what they have to say, especially as it relates to that mysterious product which you call oil."

At the offices of the Geological Division they were inclined to be skeptical as to the identity of the Siegneur LeMoyne de Bienville.

"What proof have you that this gentleman was the founder of New Orleans?" they asked the Inquiring Reporter. "His face seems familiar, but we were under the impression he died a good many years ago."

THE OMNISCIENT EDITOR

"That is a fact not to be disputed," replied the Inquiring Reporter, "but I was advised by my editor that the Siegneur was amongst the arrivals on the good ship Reconnaissance. All editors are omniscient, as you know, and I had no reason to doubt his word. And it was no canard, either, as you can jolly well see for yourself."

When the geologist was satisfied as to the identity of the distinguished visitor, he turned to his Secretary:

"Look in my personal file, under the R's, and you will find some data entitled No. 999. Give it to these gentlemen."

After a casual glance at the manuscript Bienville turned to the Inquiring Reporter.

"This appears to be a valuable piece of information, but my eyes are not so good and I will ask that you kindly read it to me. We used to be prolific letter writers, and had much leisure for correspondence, but that would seem to be a lost art, although you have a plentiful supply of the little devil machines which you call typewriters."

"It is a sort of bird's-eye view of our state's geological features," said the Inquiring Reporter, turning the pages of the manuscript. "The production of oil, gas, salt, sulphur and other mineral resources naturally creates considerable interest in the geology and geologic history of the state. The producing companies maintain geologic departments which collect and evaluate geologic information. The public interest is served and protected by the Geological and Minerals Divisions of the State Department of Conservation. The function of these Divisions is to collect geological information and make it available to the public."

THE SOVEREIGN PEOPLE

"In my day such information was considered the exclusive property of the sovereign," said Bienville. "But you have come a long way since then and you now speak of the 'sovereign people,' so that I presume it is logical that such information should become the property of the people."

The Inquiring Reporter reads:

"The surface features of Louisiana comprise its topography, which may be divided into three general regions.

[Turn to Page 56.]

New Uses for Old Stumps

Expansion of Unique Louisiana Industry

■ **Preparation of hole for dynamite to blast stump.**

Utilization of the waste products of industry is one of the major objectives of conservation. A far-flung panorama of old stumps, relicts of the sawmill era that denuded great forests in Louisiana, contributes little to the aesthetic character of the landscape, nor is there any apparent justification for it in the economic scheme.

One of the developments in the utilization of this particular product, which may well serve as an inspiration for research and enterprise in other fields of industry, is that of Termiteol, an achievement of chemical engineering over a period of 25 years.

The function of Termiteol is to preserve wood against decay, termites and other insects. Its manufacture is similar to that in the production of creosote, and it is derived from destructive distillation under high temperature. The raw material consists of downwood of long leaf yellow pine, hardwood and stump wood seven years and older.

It is manufactured in a plant at Covington, St. Tammany parish, Louisiana, and the landowners of that area are stumping their lands to supply the plant with raw material. By thus clearing the land they are eliminating fire hazard, and either reforesting this land in both slash and long leaf pine, or developing tung groves, orchards, citrus fruits, or other general farm products.

Cattle raising has now taken a bright spot in this state, the climate being such as to warrant the running of cattle at least nine months in the year. Reforestation is only practical by stumping this first cut-over timber land, and, providing soil erosion is controlled, suitable foliages are planted to produce feed for the cattle. Raising of cattle has been found to be impractical unless their feed is grown.

For many years this downwood now being used by the Termiteol plant and which consists of pine limbs, roots and stumps, was used only in the manufacture of oldfashioned tar and retort tar, their uses having been for the preservation of rope seines and as a solvent for rubber.

It is highly pleasing to know that a product which will control fungi-bacteria and other organisms of vegetable and animal matter, has been developed with the same raw materials to give the building industry and its associate interests a wood preservative which may be used without pressure and costly equipment in the treatment of fence posts, building materials and the like.

HOW THE WAR ON TERMITES STARTED

More than 25 years ago a young mining engineer walked a mile into the tunnel of a gold mine in the State of Idaho and inspected some funny looking pests that were eating away timbers.

Twenty years ago that young man, after long research to determine how to combat termites, formed the Termiteol Corporation and began operating a plant at Covington, St. Tammany parish, Louisiana, to manufacture Termiteol from pine and hardwood stumps and downwood. This product is used in the preserving of wood against termites and decay. And by ridding thousands of acres of stumps, lands which could not have been sold for more than $2 an acre are now valued at more than $50 an acre.

■ **Explosion of dynamite charge means new value for this cutover pine land.**

Of news interest this month was the announcement by this same mining engineer, Harve D. Hagerty, head of Termiteol Corporation, that capacity of the Covington plant is being increased from 10,000 to 22,000 gallons a week. Simultaneously, S. C. Braselman, vice-president of the American Creosote Works, New Orleans, announced that his company has contracted to sell the entire production of Termiteol. Under this arrangement, Mr. Hagerty, the scientific engineer, will be able to devote his entire time to production, while Mr. Braselman through the national selling organization of the American Creosote Works, will handle the sales.

Mr. Braselman expresses himself as delighted with the arrangement, saying: "The American Creosote Works has taken on a proven product, Termiteol, produced in Louisiana that has the double facility of combatting termites and preventing decay, and also ridding land of stumps. Mr. Hagerty's visit to a gold mine in Idaho was a good one not only for Louisiana but every one interested in wood preservation."

And Mr. Hagerty in behalf of Termiteol Corporation, announced: "We are glad to have established this industry in Louisiana and through our arrangement with the American Creosote Works expect to enjoy a continual increase in business. And this increase will mean more cleared land for farmers, to say nothing of the home owners and the structure and bridge builders getting rid of termites."

V. H. Sonderegger, director of the division of forestry, Louisiana Department of Conservation, views operation of the Termiteol plant at Covington as an asset through increasing value of land by stumping.

"This is efficient conservation," said Mr. Sonderegger. "Lands virtually without value have been made valuable, a blessing to landowners. In addition, there is the great blessing of producing a product which preserves wood against termites and decay.

"Most industries ruin the land from which they obtain their raw product. When the sawmills cut away the virgin timber of our Southland they left apparently valueless lands because of stumps. The Termiteol plant takes these stumps away and the land becomes more valuable than ever, and is used for farming and planting of orchards. Much of it has been used for the planting of tung trees, the newest money crop for South Louisiana and South Mississippi, while great sections have been devoted to reforesting with pine. Thus the Termiteol plant has proven a great asset and I hope the good work continues until it uses every stump in Dixie."

■ **New lumber going into vat for treatment, insuring protection and preservation.**

The Termiteol Corporation contracts with farmers for their downwood and stumps seven years and older, this age stump being best for its extractions. The farmers do the work of clearing the stumps during their off seasons. When a farmer can increase the value of his land from $2 to $50 an acre by getting rid of stumps he can figure there are gold mines in Louisiana just as there are in Idaho.

A ride through St. Tammany parish reveals the good which has resulted from the Termiteol plant's use of stumps. Great areas of corn and other crops shimmer in the sunshine on land formerly dotted with stumps. Many estates have been developed on such lands, while hundreds of small farmers have similarly improved their tracts. Orchards of a great variety are growing, notably among them tung trees; while millions of pine saplings are growing in orderly array in reforested sections. They maintain St. Tammany's description as "Ozone Belt." They are producing wealth for the future.

Termiteol was not a sudden discovery but developed after years of hard work by Mr. Hagerty and his assistant scientists. Through the study was evolved the theory that the way to combat termites was to destroy the fungi-bacteria which enabled the termite to digest the wood it ate. In other words, make the termite die of indigestion.

A simple and economical method of using it was provided. All that it needed is a vat in which the wood may be soaked in Termiteol for 24 hours. No heating is required, as it penetrates the wood on its own volition.

Mr. Hagerty has a little double-decked vat on his desk with which he demonstrates how Termiteol works. Little strips of lumber are piled in cross layers in the upper vat, then Termiteol is pumped from the lower to the upper by an air bulb until all of the wood is covered. When the wood has soaked long enough the fluid is allowed to drain back into the lower vat. Similar vats of any size desired can be constructed at low cost on the site of any job, or portable ones may be moved from job to job.

By placing vats of any length required at the site of a bridge job, timbers from the neighborhood may be preserved within a day at minimum of expense.

One of the greatest attributes of Termiteol cited by Mr. Hagerty, is that it remains toxic indefinitely after penetrating the wood, and further that it also penetrates the heart.

Among the users of Termiteol are railroad companies, and every piece of wood in many new freight cars is treated with it before the cars are built. Likewise many new homes have been built with the sawn lumber treated on the site.

With lands cleared of stumps and wood preserved against termites and decay, Termiteol plays a most important role.

◆

ORIGIN OF "TWO BITS" EXPLAINED

Recent excavation at George Washington Birthplace National Monument, Virginia, of an ancient coin concretely illustrates the origin of the phrase "two bits."

The coin was a quarter segment of a Spanish coin, valued at two **reales** and minted early in the 18th century. At that time it was common practice to cut large coins in two, to make smaller ones. Hence the piece unearthed probably passed for one-half **reale.**

Oil and Gas Wells Completed in South Louisiana During 2nd Quarter of 1939

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Grav-ity	Total Depth
ABBEVILLE (Vermilion Ph.)	Stanolind Oil & Gas Co.	Outar Blanchett #1	6/23/39	330 Bbls.	1/4	44	8,009
BANCROFT (Beauregard Ph.)	Republic Prod. Co.	Columbia L&T Co. #6	4/3/39	321 Bbls.	3/16	43	7,342
	Republic Prod. Co.	J. M. Whitman #1	4/25/39	343 Bbls.	3/16	41	7,338
	Republic Prod. Co.	Columbia L&T Co. #7	5/4/39	300 Bbls.	3/16	42	7,334
	Republic Prod. Co.	Lutcher & Moore Lbr. Co. #6	5/18/39	298 Bbls.	3/16	42	7,415
	Republic Prod. Co.	Columbia L&T Co. #8	5/23/39	300 Bbls.	3/16	42	7,336
	Republic Prod. Co.	G. F. Hennigan #1	6/14/39	291 Bbls.	316	43	7,320
BATEMAN LAKE (St. Mary Ph.)	The Texas Co.	Wax Bayou #2	5/22/39	406 Bbls.	10/64	35	10,892
BAY ST. ELAINE (Terrebonne Ph.)	The Texas Co.	LLE-Bay St. Elaine #2	4/6/39	357 Bbls.	1/8	21	6,991
BUNKIE (Rapides Ph.)	Texas-Canadian Oil Corp.	Myrtle Pope #1	4/26/39	584 Bbls.	1/4	35	7,080
	Texas-Canadian Oil Corp.	Virginia Mathis #1	6/11/39	568 Bbls.	1/4	36	5,816
CAILLOU ISLAND (Terrebonne Ph.)	The Texas Co.	State-Caillou Island #55	4/6/39	1,365 Bbls.	3/8	34	5,940
CAMERON MEADOWS (Cameron Ph.)	Magnolia Petroleum Co.	Cameron Meadows #24	6/26/39	253 Bbls.	1/4	35	5,348
CHACAHOULA (Lafourche Ph.)	Sun Oil Co.	Dibert-Stark & Brown #5	4/24/39	672 Bbls.	1/4	32	7,242
CHALKLEY (Cameron Ph.)	Humble Oil & Refg. Co.	Cameron Ph. School Board #2	4/2/39	680 Bbls.	1/4	36	8,900
	Humble Oil & Refg. Co.	K. B. Hanszen #4	6/29/39	292 Bbls.	3/16	36	8,667
CHARENTON (St. Mary Ph.)	Pan American Prod. Co.	Laws #12	4/12/39	146 Bbls.	1/8	38	7,210
	Pan American Prod. Co.	Veeder #13	5/19/39	215 Bbls.	1/4	24	2,587
	Pan American Prod. Co.	Laws Realty Co. #13	6/13/39	129 Bbls.	12/64	35	5,848
	Pan American Prod. Co.	A. Veeder Co. #14	6/14/39	57 Bbls.	Pumping	26	1,058
CREOLE (Cameron Ph.)	The Superior Oil Co.-The Pure Oil Co.	Gulf of Mexico-State #6	6/4/39	281 Bbls.	10/64	33	6,775
DOG LAKE (Terrebonne Ph.)	The Texas Co.	LLE-Dog Lake #9	6/10/39	13 Bbls.	8/64	37	7,441
DONALDSONVILLE (St. James Ph.)	Shell Petroleum Corp.	Schexneyder #1	4/19/39	60 Bbls. & 3½ MCF*	11/64	45	11,002
ENGLISH BAYOU (Calcasieu Ph.)	Union Sulphur Co.	Kaufman #8	6/4/39	308 Bbls.	14/64	40	6,957
EOLA (Avoyelles Ph.)	Pomo Oil Co.	Sentell #1	4/14/39	796 Bbls.	1/4	43	8,578
	Sid W. Richardson	Haas Inv. Co. #4	5/11/39	584 Bbls.	1/4	43	8,625
	S. W. Richardson	Bayou Bouef #1	6/1/39	746 Bbls.	1/4	43	8,549
	S. W. Richardson	Haas Inv. Co. #5	6/20/39	791 Bbls.	1/4	43	8,565
	Amerada Petroleum Corp.	Mrs. C. B. Marchive	6/11/39	470 Bbls.	1/4	43	8,601
EVANGELINE (Acadia Ph.)	Burton-Noble-Baker	Robira #7	5/3/39	530 Bbls.	1/4	39	6,912
	Shell Oil Co. Inc.	Connover Community #6	5/18/39	241 Bbls.	12/64	37	7,507
	W. T. Burton	Robira #6	4/19/39	578 Bbls.	1/4	36	6,450
	Glassell & Glassell	McFarlain #7	5/29/39	546 Bbls.	14/64	39	8,574
	Gulf Refining Co.	Arnaudet #41	6/18/39	589 Bbls.	1/4	32	7,270
GARDEN ISLAND BAY (Plaquemines Ph.)	The Texas Co.	State-Garden Island Bay #33	5/12/39	578 Bbls.	3/16	35	6,883
	The Texas Co.	State-Garden Island Bay #34	6/21/39	248 Bbls.	3/16	37	4,600
GIBSON (Terrebonne Ph.)	Shell Oil Co.	R. E. Kuntz #3	5/27/39	69 Bbls.	11/64	45	10,200
GOLDEN MEADOWS (Lafourche Ph.)	Mar-Tex Oil Corp. of La.	Falgout #1	5/10/39	275 Bbls.	16/64	36	8,524
GRAND BAY (Plaquemines Ph.)	Gulf Refg. Co.	Grand Prairie Levee District #A-4	6/26/39	768 Bbls.	1/4	37	9,700
GRAND LAKE (Cameron Ph.)	The Superior Oil Co.	Grand Lake-State #1	5/6/39	384 Bbls.	12/64	32	8,392
HARANG (Lafourche Ph.)	John Vaccaro	Acosta #2	4/16/39	107 Bbls.	12/64	32	5,410
IBERIA (Iberia Ph.)	William Helis	Bolivar #7	4/6/39	113 Bbls.	3/16	21	3,225
	The Texas Co.	Louis P. Bryant #6	4/7/39	243 Bbls.	5/16	22	3,426
	The Texas Co.	Alfred Renaudet #1	4/11/39	152 Bbls.	9/64	32	9,313
	The Texas Co.	Decuir #1	4/15/39	108 Bbls.	10/64	30	5,863
	The Texas Co.	J. P. Duhe #9	5/9/39	157 Bbls.	....	23	3,802
	Lisbon Iberia Oil Corp.	Gulf Refg. Co. Fee #7	6/12/39	356 Bbls.	3/16	28	6,080
	Canal Oil Co. Inc.	Bernard #12	6/19/39	259 Bbls.	1/4	24	3,274
JEANERETTE (St. Mary Ph.)	Herton Oil Co.	Rufus C. Banta #9	4/13/39	161 Bbls.	1/4	35	6,778
JEFFERSON ISLAND (Iberia Pb.)	The Texas Co.	Jefferson Island Salt Mining Co. #2	5/5/39	292 Bbls.	10/64	35	9,458

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* MCF—As used in this table for convenience, means—Million Cubic Feet of Gas.

Oil and Gas Wells Completed in South La. During 2nd Quarter of 1939—Cont.

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Grav-ity	Total Depth
KENILWORTH (St. Bernard Ph.)	Vendome Petroleum Corp.	Kenilworth #1	4/6/39	400 Bbls.	13/64	33	11,469
LAFITTE (Jefferson Ph.)	The Texas Co.	State-Bayou Norman #2	6/23/39	965 Bbls.	3/8	37	10,018
	The Texas Co.	School Board-Lafitte #2	6/30/39	1,107 Bbls.	3/8	39	10,195
LAKE BISTINEAU (Bienville Ph.)	Arkansas Louisiana Gas Co.	Thomas #A-1	6/12/39	100 MCF	....	....	....
	Arkansas Louisiana Gas Co.	O. G. Thomas #B-1	6/17/39	40 MCF	Open Flow	....	5,300
LAKE LONG (Lafourche Ph.)	Fohs Oil Co.	State-Lake Long #8	6/17/39	5 MCF	1/4	....	10,254
LAKE PELTO (Terrebonne Ph.)	The Texas Co.	State-Lake Pelto #24	5/8/39	129 Bbls.	3/16	28	5,949
	The Texas Co.	State-Lake Pelto #25	6/14/39	648 Bbls.	1/4	29	5,084
LIRETTE (Terrebonne Ph.)	Humble Oil & Refg. Co.	Hy. J. Ellender #2	4/13/39	32 Bbls. & 3¼ MCF*	1/4	48	8,390
	Humble Oil & Refg. Co.	La Terre Co. #2	6/27/39	3½ MCF	1/4	....	8,450
NORTH CROWLEY (Acadia Ph.)	Humble Oil & Refg. Co.	Anton Ohlenforst #4	4/28/39	680 Bbls.	1/4	35	8,314
	Humble Oil & Refg. Co.	R. C. Davis #1	5/21/39	812 Bbls.	1/4	35	8,180
NORTH TEPETATE (Acadia Ph.)	Atlantic Refg. Co.	Doga #1	4/16/39	90 Bbls. & 3 MCF	3/16	54	8,976
	Atlantic Refg. Co.	C&R Klumpp #4	4/21/39	8 Bbls. & ½ MCF	1/4	56	8,556
PARADIS (St. Charles Ph.)	The Texas Co.	LL&E Paradis #1	6/26/39	108 Bbls.	16/64	53	10,787
PORT BARRE (St. Landry Ph.)	Pan American Prod. Co.	H. L. Garland #4	4/20/39	604 Bbls.	1/4	37	5,191
POTASH (Plaquemines Ph.)	Humble Oil & Refg. Co.	Orleans Levee Board #38	5/11/39	400 Bbls.	3/16	28	8,060
QUARANTINE BAY (Plaquemines Ph.)	Gulf Refg. Co.	Plaquemines Land Co. #A-1	4/1/39	378 Bbls.	1/4	36	8,186
	Gulf Refg. Co.	La. State "QQ" #8	4/20/39	483 Bbls.	1/4	35	8,175
	Gulf Refg. Co.	Plaquemines Land Co. #A-2	6/5/39	108 Bbls.	1/4	41	8,158
	Gulf Refg. Co.	Orleans Levee Dist. #A-3	6/6/39	550 Bbls.	1/4	34	8,150
	Gulf Refg. Co.	State "QQ" #10	6/30/39	187 Bbls.	7/32	35	8,562
RACELAND (Lafourche Ph.)	Amerada Petroleum Corp.	South Coast Corp. #4	5/31/39	240 Bbls.	8/64	36	10,199
	Tide Water Assoc. Oil Co.	So. Coast #2	6/30/39	24 Bbls.	9/64	46	10,461
SOUTH HOUMA (Terrebonne Ph.)	Shell Oil Co. Inc.	Peters #3	6/24/39	565 Bbls.	15/64	35	10,315
SOUTH ROANOKE (Jeff. Davis Ph.)	Continental Oil Co.	J. Sturdivant #2	4/4/39	181 Bbls.	5/32	52	9,920
TIMBALIER BAY (Lafourche Ph.)	Gulf Refg. Co.	La. State "PP" #4	4/6/39	66 Bbls.	12/64	26	5,340
UNIVERSITY (East Baton Rouge Ph.)	William Helis	J. T. Williams #1	4/15/39	275 Bbls.	12/64	35	6,481
	William Helis	Nelson #4	4/24/39	2½ MCF	3/16	....	7,530
	Lisbon Iberia Oil Co.	Duplantier #1	5/21/39	480 Bbls.	12/64	37	6,471
	Geo. H. Echols	Duplantier #1	6/19/39	222 Bbls.	8/64	36	6,506
	Lisbon Iberia Oil Corp.	DA & EA Duplantier #2	6/23/39	435 Bbls.	3/16	36	6,470
	Geo. H. Echols	Geo. F. Morgan #1	6/26/39	412 Bbls.	10/64	36	6,508
	T. G. Markley & Crosby	Knox, Amiss & Farnbacker #1	6/26/39	518 Bbls.	12/64	36	6,476
	William Helis	Duplantier #1	6/28/39	330 Bbls.	12/64	35	6,472
VENICE (Plaquemines Ph.)	Tide Water Assoc. Oil Co.	Manhattan Land & Fruit Co. #8	4/20/39	275 Bbls.	7/64	49	7,225
	Tide Water Assoc. Oil Co.	Buras Levee Dist. #4	4/21/39	228 Bbls.	9/64	43	7,185
VILLE PLATTE (Evangeline Ph.)	Continental Oil Co.	Rene McDaniel #1	4/5/39	504 Bbls.	3/16	39	9,078
	Continental Oil Co.	Opl-St. L. Sec. Co. #3	4/5/39	487 Bbls.	3/16	38	9,063
	Continental Oil Co.	Tate-McDaniel #3	4/28/39	336 Bbls.	3/16	37	9,090
	Continental Oil Co.	W. L. Tate #1	4/28/39	311 Bbls.	3/16	62	10,939
	Continental Oil Co.	Mrs. Ed Tate #3	5/12/39	305 Bbls.	3/16	39	8,971
	Continental Oil Co.	P. McDaniel #4	5/15/39	430 Bbls.	3/16	39	9,082
	Continental Oil Co.	Folanie Tate #3	5/28/39	426 Bbls.	3/16	39	9,057
	The Texas Co.	E. B. Norman #3	5/31/39	75 Bbls.	12/64	?	9,047
	Continental Oil Co.	Fontenot-Ludeau #2	6/1/39	476 Bbls.	3/16	39	8,983
	Continental Oil Co.	Hattie Haas #3	6/13/39	315 Bbls.	3/16	53	10,652
	Continental Oil Co.	Ludeau-Haas #3	6/15/39	384 Bbls.	3/16	39	9,069
	Continental Oil Co.	Orise Deville #2	6/22/39	159 Bbls.	3/16	53	9,120
WEST CHARENTON (St. Mary Ph.)	St. Mary Oil Co.	Paul LeBlanc #5	4/23/39	141 Bbls.	?	20	1,133
	St. Mary Oil Co.	Hertel #A-3	5/4/39	330 Bbls.	Open	20	1,130
	St. Mary Oil Co.	Hertel #A-2	5/5/39	8 Bbls.	Open	20	1,149
WEST HACKBERRY (Cameron Ph.)	The Superior Oil Co.	D. Kaough #2	4/2/39	395 Bbls.	10/64	38	6,750
	The Superior Oil Co.	Dorisse Kaough #1	6/13/39	505 Bbls.	11/64	39	7,150
WOODLAWN (Jeff. Davis Ph.)	The Union Sulphur Co.	Donovan & O'Connor #1	4/29/39	142 Bbls.	40/64	32	9,305
	The Union Sulphur Co.	O. Miller #2	5/30/39	85 Bbls.	14/64	51	9,393

* MCF—As used in this table for convenience, means—Million Cubic Feet of Gas.

Oil and Gas Wells Completed in North Louisiana During 2nd Quarter of 1939

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Grav-ity	Total Depth
COTTON VALLEY (Webster Ph.)	Hassie Hunt	Davis #11	4/2/39	181 Bbls.	1/4	?	5,952
	Magnolia Petroleum Co.	Sidney Cox #1	4/9/39	190 Bbls.	1/4	46	8,647
	Hassie Hunt	Hodges #1	4/10/39	154 Bbls.	1/4	49	5,967
	Magnolia Petroleum Co.	Coyle-Hodges Unit #1	4/20/39	828 Bbls.	?	35	8,667
	Hunt Oil Co.	Bodcaw-Stewart #4	4/21/39	415 Bbls. & 5 MCF	3/8	63	?
	Hunt Oil Co.	Bodcaw-Stewart #5	5/12/39	348 Bbls.	3/8	64	8,347
	Midstates Oil Corp.	T. K. Giddens #1	5/14/39	285 Bbls.	6/32	41	8,628
	Ohio Oil Co.	Bodcaw-Lbr. Co. #5	5/22/39	420 Bbls. & 6 MCF	3/8	70	8,335
HOMER (Claiborne Ph.)	Sinclair Prairie Oil Co. of La.	Len Langston	4/5/39	5 Bbls.	....	36	1,408
MONROE (Ouachita, Union & Morehouse Phs.)	United Carbon Co.	N. R. Nolan #3	4/20/39	1½ MCF	....	....	2,176
	Southern Carbon Co.	Richland #7	4/25/39	1½ MCF	....	....	2,210
	United Carbon Co.	Crossett #4	5/18/39	2½ MCF	....	....	2,229
	United Carbon Co.	Freeland-Odom #2	6/7/39	3 MCF	....	....	2,233
	W. E. Hope Gas & Oil Co.	Union Power Co. #1	6/23/39	7 MCF	....	....	2,222
PINE ISLAND (Caddo Ph.)	The Texas Co.	D. H. Raines #21	4/20/39	432 Bbls.	1/4	?	1,761
	The Texas Co.	D. H. Raines #22	5/25/39	408 Bbls.	2	?	1,741
	The Texas Co.	Caddo Mineral Land Co. #52	6/16/39	30 Bbls.	Pumping	?	1,643
SHONGALOO (Webster Ph.)	Magnolia Petroleum Co.	Roseberry Unit #1	4/5/39	149 Bbls.	1	49	9,380
SHREVEPORT (Caddo Ph.)	R. E. Allison Drlg. Co.	S. J. Harmon #1	4/5/39	396 Bbls.	1/4	44	5,577
	Hurricane Petroleum Co.	S. J. Harmon #1	4/8/39	195 Bbls.	20/64	46	5,615
	R. E. Allison Drlg. Co.	La. Real Est. & Dev. Co. #1	4/11/39	264 Bbls.	1/4	44	5,608
	C. H. Lyons	McFadin #1	4/12/39	295 Bbls.	12/64	45	5,631
	R. E. Allison Drlg. Co.	Ellerbe #7	4/16/39	462 Bbls.	1/4	45	5,564
	Lisbon Iberia Oil Corp.	J. P. Wallace #1	4/17/39	300 Bbls.	?	47	5,602
	Wynne Drilling Co.	Exchange Nat'l Bank Unit #1	4/19/39	528 Bbls. & 2 MCF*	?	47	5,561
	Harry Hanbury	Feist #1	4/23/39	389 Bbls.	1/4	45	5,556
	Lake Prod. Co.	M. S. Herndon #1	4/24/39	287 Bbls.	1/4	46	5,624
	Hurricane Petroleum Corp.	Harmon #2	5/3/39	536 Bbls.	16/64	45	5,571
	R. E. Allison Drlg. Co.	Ellerbe #8	5/8/39	264 Bbls.	4/16	46	5,560
	W. R. Nicholson Oil Co.	Exchange Nat'l Bank #1	5/9/39	360 Bbls.	32/64	47	5,556
	Lisbon Iberia Oil Co.	James Morgan #1	5/12/39	420 Bbls.	32/64	45	5,614
	Hurricane Petroleum Corp.	De Soto Corp. #1	5/13/39	520 Bbls.	16/64	45	5,565
	R. E. Allison Drlg. Co.	Ellerbe #10	5/17/39	298 Bbls.	4/16	46	5,559
	R. E. Allison Drlg. Co.	Ellerbe #9	5/18/39	562 Bbls.	5/16	46	5,560
	Wardell Oil Co.	Clark & Hutchinson #1	5/18/39	312 Bbls.	3/8	46	5,557
	Harry Fotiades	E. Wayles Brown #1	5/25/39	149 Bbls.	20/64	46	5,592
	R. E. Allison Drlg. Co.	Ellerbe #6	4/15/39	396 Bbls.	1/4	45	5,565
	Wardell Oil Co., & Harry Fotiades	Robert Mandell #1	6/21/39	264 Bbls.	32/64	43	5,556
	Lisbon Iberia Oil Corp.	Atkins #1	6/25/39	480 Bbls.	16/64	44	5,640
TULLOS (La Salle Ph.)	C. C. North, Trustee	Russell #B-4	4/10/39	12 Bbls.	?	21	1,549
	W. B. Jarvis	Montague Oil Co. #A-1	5/12/39	50 Bbls.	....	21	1,503
ZWOLLE (Sabine Ph.)	The Hunter Co.	Bowman-Hicks Lbr. Co. #9	5/9/39	66 Bbls.	....	39	2,579

* MCF—As used in this table for convenience, means—Million Cubic Feet of Gas.

Our Oil Reserves

[Continued from Page 10.]

found, upon the completion of the survey of the Gulf Coast area by the reflection seismograph, we will again be in precisely the same position as to prospecting as were the operators of the Gulf Coast about 1903 or 1904, when practically all the salt domes of the period were known and a prospect off a known dome was probably worse than a several hundred-to-one shot.

RESERVES DEFINITELY LIMITED

I should like to warn against one possible interpretation of my description of the art of prospecting as a dynamic one. For every technique there seems to be an area where its use is not satisfactory and it is generally in such areas that any new technique has its greatest opportunity. Whatever the amount of oil in the United States may be, our reserves are definitely limited and they are being exhausted at the rate of over one billion barrels per year. The discovery of additional oil by new techniques cannot go on indefinitely. We are in the position of a man who seines a pond for fish with nets of different mesh. Through the larger meshes certain fish may escape but finally we come to a mesh so small that nothing escapes which is worth having. Our oil deposits, however great they may be are definitely limited and we will finally arrive at the day when technologic change in the art of prospecting is no longer the answer.

It may appear to be extraneous to my present thesis but I cannot bear to close a consideration of any phase of the art of prospecting without reference to the greatest single element in all prospecting, past, present, and future—the man willing to take a chance. Our oil reserves, in the past, have not been discovered by the major companies but by men; venturesome independents, little syndicates, local groups organized to drill a single wildcat well, and the small companies. The most advanced prospecting technique, with its expensive requirements of geophysical surveys, heavy expenditures for leasing, and deep and expensive wells has changed this somewhat. Operations of this sort, hazardous and expensive as they are, lie beyond the capacities of most individuals but the bulk of discovery, in units of pools at least, is still with the independent wildcatter—two to one.

Bienville Returns

[Continued from Page 50.]

"The marsh and lake area includes most of southern Louisiana south of the latitude of Baton Rouge. As the name indicates the area is characterized by marshes and lakes. The surface of this region rises gently from the coast to its inner margin, which is about twenty feet above sea level."

"This region gradually becomes drier towards its northern limits and passes into the region of alluvial prairies, low rolling hills and wooded plains, including the portions of the state between 20 and 100 feet above sea level.

"Northward the prairies become less extensive and except for the valleys of the Mississippi and Red Rivers, the surface is quite hilly. The hill lands cover a large area in northwestern Louisiana and also in the northern part of the Florida Parishes."

HARDY EXPLORERS

"The early French and Spanish explorers were very much interested in topography," said Bienville. "But even on forced marches it would take us days and weeks and months to cover ground that those giant birds in the sky will fly over in a few hours."

The Inquiring Reporter proceeded:

"The rocks exposed at the surface in Louisiana consist almost entirely of clay, sand and marl beds. These materials, except for the flood plain deposits along present streams, were deposited in the Gulf of Mexico when that body of water was much larger than now and covered large portions of the Gulf coastal states. Some of these beds represent ancient deltas of the Mississippi River and other large streams of the region, others represent deposits in marine water, offshore from these ancient deltas.

"The relationship and distribution of these beds indicate a progressive but gradual retreat of the Gulf and an accompanying rise in elevation of the northern part of the state. As the beds became dry land and rose higher and higher, stream erosion produced the hill lands. Due to these changes the oldest beds are found in the northern part of the state with progressively younger beds southward. The youngest deposits are found along the coast and in the alluvial valleys of the present streams."

"Stratigraphy is no doubt an important subject," said Bienville. "But I am particularly interested in its relation to that liquid 'black gold' which we were discussing awhile back."

RECORD OF THE ROCKS

"I am coming to that," replied the Inquiring Reporter, as he continued:

"Geologists divide the history of the earth into five great eras. The record of events in the history of the earth is found in the rocks which everywhere underlie the surface soil or outcrop at the surface where the soil is absent. The history recorded by the rocks exposed in Louisiana or encountered in oil wells in the state, covers only the youngest and shortest of the five eras and the latest part of the preceding era. The history of Louisiana during the earlier eras can be known only by inference from records preserved in the rocks of adjacent states because the younger rocks found in Louisiana conceal the older record.

"At a time just preceding the dawn of the youngest era, about 60,000,000 years ago, the shoreline of the Gulf of Mexico was north of the present state of Louisiana and the state was completely submerged under the Gulf's waters. The deposits made at that time are now found at the surface in the very northern part of this State and in Arkansas. These beds continue southward beneath the younger beds and are penetrated by some of the deeper oil wells in the central part of the state.

"Since the time when these beds were deposited the shoreline has moved southward so that younger beds are found nearer the present shoreline and at shallower depths in oil wells.

"In the southern part of the state, along the general line of the present shore line, the deepest oil wells, over 13,000 feet, penetrate the younger beds. If the older beds continue southward under the coastal region, and there is very good reason to believe that they do, then the rocks found at the surface in north Louisiana and Arkansas would be reached only by wells along the coast at least 30,000 feet deep!"

OIL WELLS FIVE MILES DEEP

"That is well-nigh inconceivable," said Bienville. "But if science continues to make the progress that it has made in recent years it is not beyond the bounds of possibility that you will live to see oil produced from the five-mile depth. Possibly on my next visit," he added with a chuckle, "you will be able to show me such a phenomenon."

"On your next visit you will probably find me on WPA," said the Inquiring Reporter. "You would make a good subject for some writer's project yourself."

"Let us return to our mutton," said Bienville.

The Inquiring Reporter continued:

"Oil was discovered in Louisiana in 1901, when the Jennings field was brought in, but it was some years before the relation of oil to the salt domes of South Louisiana was clearly focussed as a picture in the scientific mind.

"The tedious processes by which man acquires and assimilates useful information is illustrated by the romantic story of oil in Louisiana. When the early French and Spanish explorers contacted the Indians of this territory they were surprised to find that the red man was familiar with the various properties of salt, which was evaporated from springs of salt water prevalent in the region.

"Yes, salt was known to the ancients," said Bienville, "but I recall that we were astonished to find that its medicinal value was appreciated by the savages."

RE-DISCOVERY OF SALT

The Inquiring Reporter: "In 1791 these salt springs were re-discovered on what is now known as Avery Island, but it was not until 1862 that John Avery located the bed rock which indicated the presence of a vast supply of salt on the island.

"The salt in Louisiana occurs in the form of salt plugs or cylindrical masses of salt, which penetrate the bedded rocks. These plugs form the central portions of salt dome structures from which much of the oil is produced.

"It is believed that somewhere beneath the thick bedded rocks there was a bed of rock salt. This bed of salt was precipitated from sea water in a more or less enclosed arm of a sea, more ancient than the expanded Gulf to which we have referred.

"As the younger beds were deposited the weight became more than the salt could support. This great pressure caused the salt to flow and seek relief by moving toward the surface. This movement occurred at points of weakness in the overlying beds and, once started, more and more salt followed the same path. The result of this process was the formation of vertical columns of salt slowly pushing their way toward the surface. These columns are the salt plugs. Some of them came nearly to the surface, as in the Five Islands of the Gulf coastal region.

"These salt plugs and their associated salt dome structures occur in two areas. One of these areas includes most of the marsh and lake region along the Gulf Coast; the other is in northern Louisiana, including Winn, Bienville, Jackson and adjacent parishes. The latter area is known as the 'Interior Salt Dome Area.' "

"I NEVER SUSPECTED—"

"I never suspected that Louisiana had so much salt," said Bienville. "But of course in my day we only had ears for the fabulous tales of gold that came out of the West."

The Inquiring Reporter proceeded:

"While the salt plugs were moving upward, and perhaps to a certain extent after they arrived at their present positions, some of the salt in the upper part was being dissolved. The impurities in the salt accumulated on top of the salt plug, forming what is known as 'cap rock.' The original materials of the cap rock were altered by various processes to produce a variety of substances including 'limestone' and sulphur. At Winnfield the 'limestone' cap rock is exposed in an open quarry whereas a stone's throw away is a salt mine which reaches the underlying salt at a depth of only a few hundred feet.

"The amount of cap rock varies, some plugs having little or none, whereas other plugs are covered by several hundred feet of cap. Even where cap rock does occur, it does not necessarily contain either limestone or sulphur. The origin of these salt plugs is a rather recent event in the geologic history of Louisiana, for many of the plugs penetrate some of the youngest beds of the state."

"It all intrigues me," said Bienville "but I am eager to hear more about your oil development. "I am no fortune teller, but I judge from what I have heard that Louisiana is on the threshhold of a new era—you might call it another golden age, although that is the term applied to the encouragement of the arts under our Majesty Louis the Fourteenth."

The Inquiring Reporter went on with the story.

"Following the development of the Jennings field many shallow wells were drilled throughout South Louisiana, the gas seepage in this region proving a sort of mirage of fool's gold to lure on the prospector. Geological and engineering knowledge was so slight in those days that it was only by accident that an occasional wildcat was successful. But the discovery of the Jennings field did have the effect of stimulating the scientific mind to further inquiry and study of the suggested relation of oil to salt, the pioneer Jennings wells having been drilled on top of a salt dome.

"Many of our more enterprising geologists went to Europe, where the salt domes of Rumania had been studied for some years and learned discussions of the subject had been published in Germany. They learned a good deal about the mechanics of salt dome intrusion, and the application of this new knowledge to what was already known about sedimentary or marine depositions gave them a better picture of the oil structures of Louisiana.

"The geologists were getting closer to the fact that oil had been formed in the bedded rocks as they were deposited and finally accumulated in the sand layers, which are porous and permeable.

■ Class in Conservation, Second Annual 4-H Wildlife Camp, near Pollock, Louisiana, summer 1938. The third encampment will extend from August 7th to August 11, 1939 and will have an attendance of approximately 150.

This Wildlife camp is a cooperative enterprise, with the Extension Service, Louisiana State University, U. S. Dept. of Agriculture, La. Dept. of Conservation and other state and federal agencies taking care of management and instruction, and the Federal Cartridge Company of Minnesota contributing cash to take care of expenses.

THE SALT PLUG DID IT

"As a salt plug moved upward through the bedded rocks it arched the beds above it into dome shaped structures. Where the salt cut across the beds in its upward course these beds remained uparched but ending against the flank of the salt.

"If the domed beds or the beds abutting against the salt were oil sands the liquid 'black gold' would migrate up the slope of the beds and accumulate in the highest part of the dome above the salt, in the upper ends of the beds against the sides of the salt or in the cap rock. In any or all of these places it would remain trapped until wells tapped the reservoir."

"Just to think!" exclaimed Bienville, "I was practically sleeping on top of this potential wealth throughout my entire visit. But our sovereign would surely have been disgusted at the sight of your liquid 'black gold,' not knowing the great power that was stored in it."

The Inquiring Reporter proceeded:

"While the geologist was gleaning and digesting all of this data the drilling technique of the producers was being improved, so that by 1914 oil had been found in the sands around the flanks of salt plugs and this resulted in the drilling of many deep wells and the finding of deeper and deeper production.

"In North Louisiana much of the oil and gas is not directly associated with salt plugs. In this region the sand beds have been arched upward by forces not so well understood, thus forming traps or reservoirs in which the oil accumulates. In some of the fields of North Louisiana the beds are broken or faulted; that is, tilted so that the oil accumulates against impermeable materials.

THESE BEDS WERE OLDER

"In many of the North Louisiana oil and gas fields production is obtained from beds somewhat older than the oldest beds exposed in Louisiana. These beds were deposited in the expanded Gulf during the latter part of the second youngest era of earth history, but belong to the rocks usually referred to as the 'Gulf Coastal Plain Sediments,' which also include the younger beds found in Louisiana. These older rocks are found at the surface in southwest Arkansas.

"Further impetus has been given to the development of the oil industry in Louisiana in recent years by the improvement in seismograph instruments of reflection and refraction. More intensive and scientific methods of exploration has greatly reduced the percentage of dry hole wildcats."

"Since 1901 Louisiana has produced over 800,000,000 barrels of oil, over 3,000,000,000,000 cubic feet of natural gas. Now many geologists believe that the oil and gas industry of the State has only just begun and that the future will bring far greater production."

"That will suffice for one sitting," said Bienville. "Let us now repair to one of those restaurants for which New Orleans is justly famous. I understand that your chefs have perfected some Creole dishes that will compare favorably with the nectar and ambrosia diet to which I have been accustomed since my last visit."

"You said a mouthful, M'sieur," replied the Inquiring Reporter. "The newspaper man, even if he calls himself a journalist, may always be depended on to react favorably to such a suggestion. Let's go."

Needed—Sane Program of Ecology

[Continued from Page 7.]

and occasionally a lynx and bobcat. In 1912 on the Degolia marsh, a tract of from 1,000 to 1,200 acres, from November 1 to December 20, the date when the marsh froze over, two trappers camping together caught 7,634 muskrats. During a period of a few days after the freeze-up they speared 1,300 more in their houses on the same grounds. This was a good rat marsh but not any exception to many others along the Kankakee. In the winter when the swamp was frozen over, fur was hunted on the ice."

SOME DRAINAGE EFFECTS

Mr. William Bridges describes the effects of drainage of this million-acre tract: "Speculators saw the possibilities of a straightened channel that would drain the entire valley and they pushed it through. A State drainage law was passed to speed up the wreckage of the old marsh and in the space of a few years 87.8 miles of arrow-straight new channel had been cut through the valley and narrow drainage ditches dug to carry the marsh water to it. When they finished the last of these lateral ditches at the Indiana-Illinois State line in 1917, the project had cost a million and a quarter dollars and the real costs were just starting.

"It was advertised by the promoters as the 'richest farmland in the world' and excursion trains were run into the Kankakee country from all over the Middle West. The intricate system of drainage ditches was to avert a return of the floodwaters—and they did as long as the ditches were new and clean. But the loose-sandy soil washed easily and the drainage ditches began to fill up along with the new river channel. Dredging assessments piled up and in some sections crops would not thrive.

"Today thousands of acres of the old Grand Marsh have been abandoned and I have traveled for mile after mile over sandy trails in a wilderness of weeds and scrubby trees, occasionally crossing a choked-up ditch with its pool of stagnant water. . . ."

These observations are confirmed by the testimony of Mr. William Vogt, of the National Association of Audubon Societies.

Conservationists argue that of the 84,408,093 acres of land in agricultural drainage enterprises more than 10,000,000 acres were reported as being delinquent in drainage taxes or in arrears in payment of drainage bonds in 1930. Were this type of drainage economically successful it does not seem probable that maintenance payments would be allowed to lapse. The wastefulness of drainage is further indicated by the fact that 23.7 per cent—nearly one-quarter—of the land in drainage enterprises was reported in 1930 not to be under cultivation. Anyone who is familiar with the widely ditched regions of the Middle West knows of many instances in which the land would have been worth considerably more to the commonwealths in which it is found if it had been left to produce crops of furs and other wildlife, and to contribute to the water table. In central Wisconsin, near Necedah, the Resettlement Administration is at present moving impoverished farmers off a tract of 150,000 acres, much of which land was placed under production only after drainage.

DEFINITE PROGRAM NEEDED

I trust that nothing in the preceding paragraphs will suggest or imply that I am opposed to reclamation in itself. I am whole-heartedly in favor of the drainage project advocated by the Association of Commerce and other interests for the suburban area tributary to the City of New Orleans. My purpose in calling attention to the failure of certain drainage and mosquito control projects in other states is merely to emphasize important aspects of a problem that should have the benefit of scientific study and discussion.

Whereas the drainage of large areas of marsh-land may not be practical, it is undoubtedly true that a fair proportion of our wet lands will sooner or later be laid out as drainage districts; and I am thinking that we should have a rather definite program of ecology, taking into consideration the effect of these projects on our wildlife, the reduction of our water levels, etc.

In no other state is this problem quite so important as in the State of Louisiana, for no other state has been blessed by Nature with such an abundance of rich ground and water resources for the propagation and sustenance of our great variety of wildlife.

Surely we should profit by the example of other sections of our country whose natural resources have been so sadly depleted, even destroyed, and not rush blindly towards a mirage of misdirected enterprise.

No doubt there is a sane middle course which will give us the benefits of reclamation and mosquito control and at the same time conserve the natural resources which are such a rich heritage of our people.

* * *

Wood flour is an excellent absorbent for nitroglycerin in the manufacture of dynamite.

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LOUISIANA LEADS IN PULP AND PAPER PRODUCTION

Louisiana leads the South in pulp and paper production. A new industry and new wealth have replaced the large saw mills that have cut out.

The U. S. Forest Service for the year 1937 issued the following statistics:

U. S. Total	Louisiana	
Cordwood		
10,393,800 cords	778,778 cords	7.5%
Wood Pulp		
6,572,918 tons	505,603 tons	7.7%
Paper		
12,837 003 tons	533,977 tons	5%

With intense forest fire protection and proper cutting methods Louisiana will furnish the markets a continuous supply of pulp and paper.

From the barefoot boy, fishing with line and pole in the perch hole of the homestead creek, to the rod-and-reel sportsman, fishing for Speckled Trout, Redfish, Sheepshead, King Mackerel or Tarpon, in the salt waters off-shore, there is no outdoor sport or recreation that interests so many of our people.

Fishing ranks ahead of football, baseball, golf and tennis in the numbers who enjoy its wholesome diversion, drawn from every walk of life. In the money expended for fishing togs and tackle, bait, transportation, etc., it is a major item of BIG BUSINESS.

In the extent and variety of its fishing waters no State is the equal of Louisiana. This is explained by the geological history of the State, the formation of its thousands of inland lakes, lagoons and bayous, its long coast line and indenture of bays and estuaries.

Out of 31,000,000 acres within the boundaries of Louisiana approximately 2,000,000 acres are under water, so that theoretically every man, woman and child in the State is entitled to an acre of water in which to fish.

The Mississippi River has not only drawn on the upper reaches of the Continent for the rich alluvial silt that constitutes the top soil of Louisiana land; the fishing waters here have been supplied with River-borne food elements that provide the sustenance of a great variety of fresh and brackish water fish.

This is an asset that contributes to the continued diversion and happiness of our own people and attracts thousands of visitors from all parts of the country.

With better transportation, more automobiles and concrete highways, America is increasingly travel-minded — in the immediate years to come "LOUISIANA FISHING" will be the magnet that draws America in this direction.

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Louisiana offers . . .

1. Accessibility to natural resources —raw materials for fabrication.

2. Cheaper fuel from natural gas.

3. An equable climate that permits of outdoors work the year 'round.

4. Rail and water transportation facilities in the heart of the most extensive inland waterway system in the United States.

5. Comfortable living conditions that contribute to the contentment of workers. Fishing, hunting and other outdoors sports the year 'round.

6. A virgin field for industry, with the trend of industry southward from the congested areas of the North and East. The comparatively flat terrain lends itself to the construction of industrial plants.

7. Ten-year exemption from taxation by the State of Louisiana.

Transportation

is a most important factor in the development of industry . . .

No other state of the Union offers industry such a combination of rail and water facilities for transportation—a vast network of inland waterways, rivers and canals, connecting industrial plants with the populous centers of distribution and consumption throughout the country.

DEPARTMENT OF CONSERVATION

STATE OF LOUISIANA